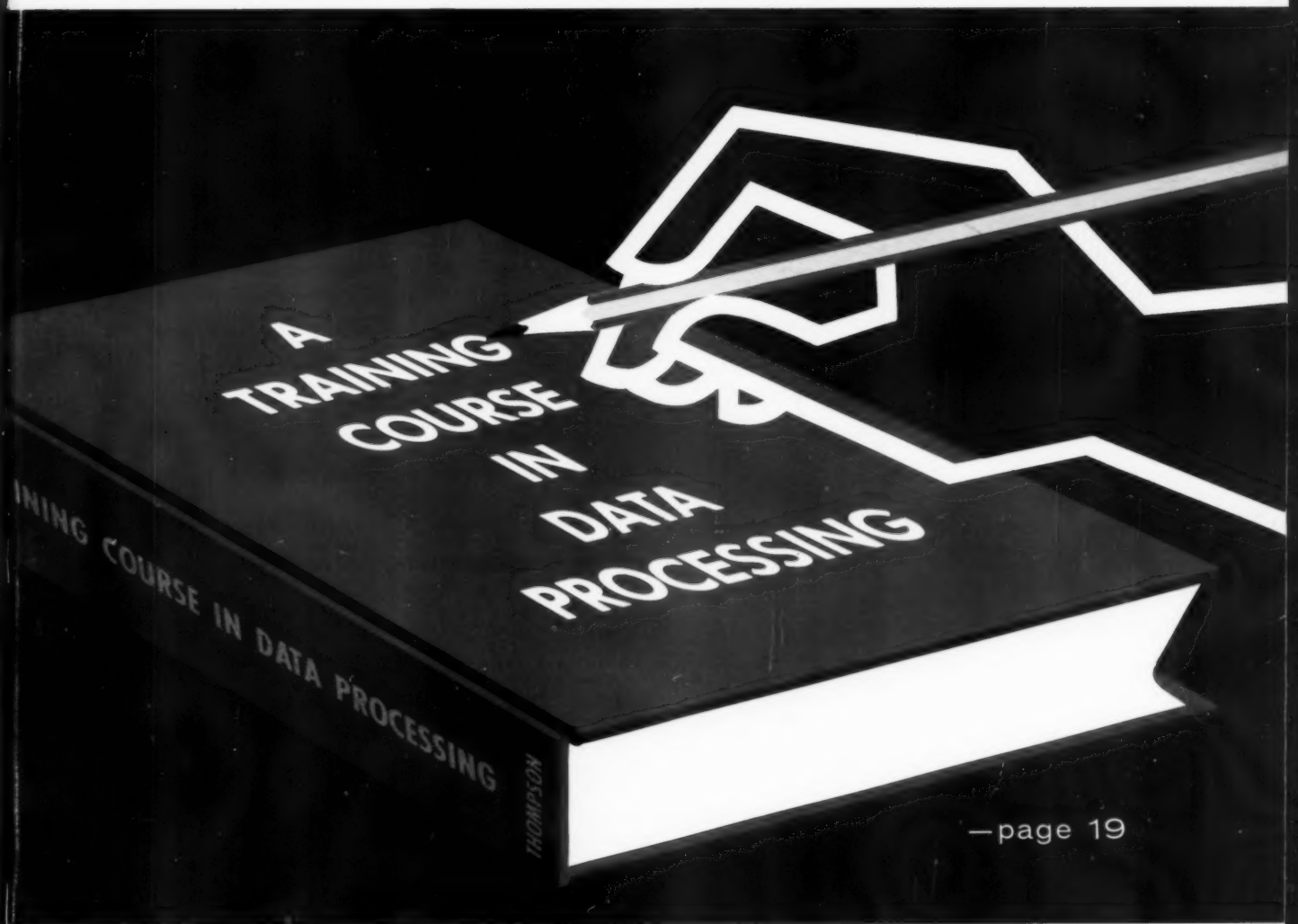
SEPTEMBER 1960

DATA PROCESSING®

THE MAGAZINE OF AUTOMATIC OFFICE METHODS AND MANAGEMENT



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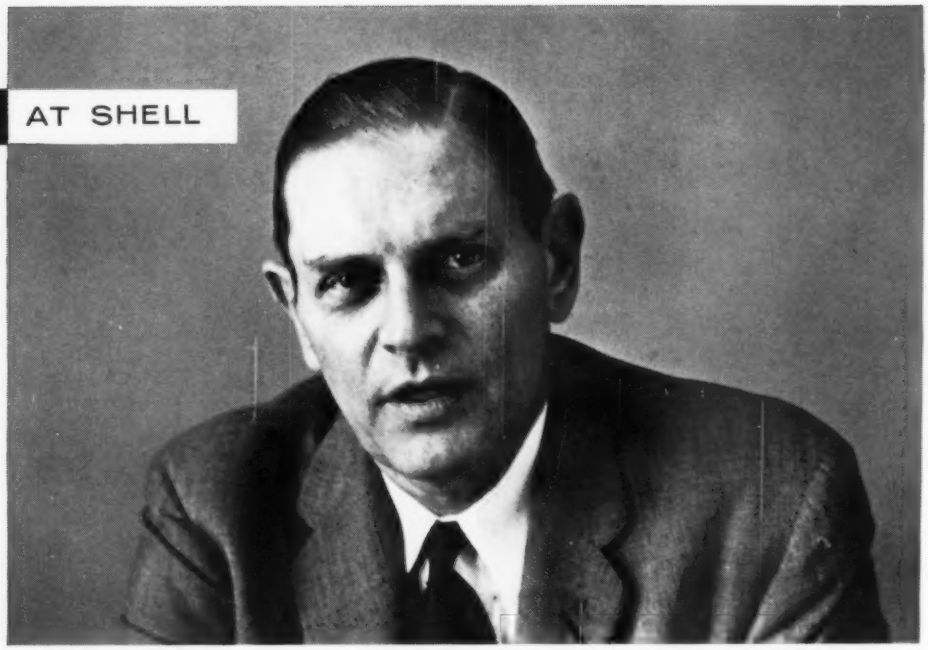
CONTROL AT SHELL



J. W. Haslett, Methods and Procedures Manager, Shell Oil Company

How Shell Oil gets out 50,000 statements a day

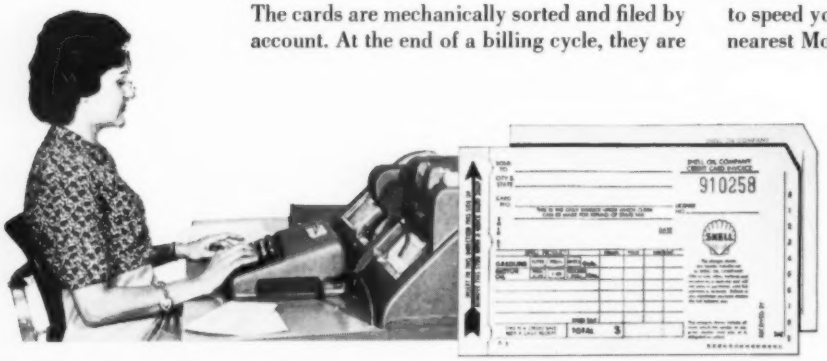
Shell Oil Company's new automated system speeds the processing of paperwork involving 60,000,000 forms. The system maintains a high degree of accuracy, and has improved billing service to over 1,000,000 credit card customers.

The basic unit in the system is the sales ticket—a two-part tab card set. At the time of sale, the customer's credit card is used to imprint his name and address; the details of the transaction are entered by hand. Part 2 of the ticket goes to the customer. The tab card (Part 1) is forwarded to the company's main office, where the handwritten information on the card is punched into the card itself.

The cards are mechanically sorted and filed by account. At the end of a billing cycle, they are run off on electric accounting machines which automatically print a complete statement and punch a return card for the customer. After being microfilmed as a permanent record, the cards are sent with the statement.

Automation has virtually eliminated transcribing errors. Processing is faster at every stage, from the point of sale to the reconciliation of receipts. The sales ticket is a specially designed Moore form—the Company's control in print.

The Moore representative worked closely with Shell in developing the forms that make this ADP (Automated Data Processing) system work. For more details on what Moore can do to speed your paperwork, get in touch with the nearest Moore office. No obligation, of course.



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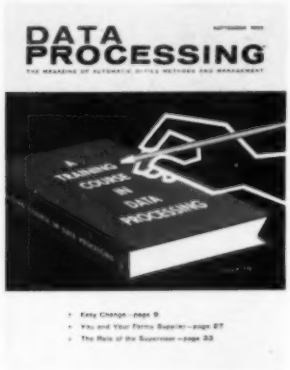
DATA PROCESSING

Volume Two • Number Eight



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Also publishers of The Punched Card DATA PROCESSING Annual (Applications Volumes and Reference Guide) and Data Processing Handbooks. Application for 2nd class entry pending at Detroit, Michigan.

OBSERVATIONS . . .

from the publisher . . .

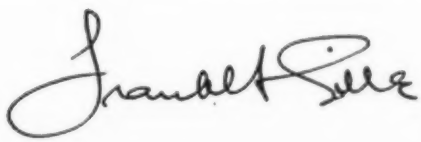
IN REVIEWING OUR OPERATIONAL REPORTS, I note that during the last two months DATA PROCESSING has added more than 1,000 new subscribers. This is the largest number of prime readers that have been added during any like period since the early months of publication. I would like to welcome you new subscribers and to express my thanks for the confidence you have placed in us by ordering this magazine for the next year or more.

We realize that we now have the responsibility of furnishing you with worthwhile information and ideas. Information is available from many sources — ideas are not so easy to come by. We receive, and you undoubtedly do also, great quantities of *information*, most of it unsolicited, much of it unworthy of the time necessary to read it. *Ideas*, however, must be created. Our editors create the ideas you need to improve your data processing systems.

Before the first issue of this magazine was published, the advertising manager of one of the leading supplier companies in this field wrote me, urging that this publication should not become one which relies on publicity material for its editorial content. From his knowledge of our previous publishing activities in this field, he stated his confidence that we could resist the temptations of following this apparently easy publishing practice. He expressed his desire to see a magazine appear that would be impartial to its readers and that would serve the *reader* primarily and the advertisers as a by-product of this. I could not have better outlined our objectives more clearly myself.

Besides the staff-written features in DATA PROCESSING, most other material is written at our specific request and under the direction of our editors whose purpose it is to maintain an effective balance. Except for that publicity material which we find sufficiently of interest to include, all articles appearing in DATA PROCESSING are paid for at a rate equal to or above the national average for business publications.

Again, new subscribers, a hearty welcome. We are here to serve you. I hope that you will be a participating reader by giving us your ideas and comments in the months to come.



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AUTHORS

ROY J. BROWN ("THE ROLE OF THE SUPERVISOR") has spent the last five years installing punched card systems in the Atlantic Provinces. In 1956 he was a part of the planning group for the Canadian National Railways installation. In 1957 he set up and supervised the Irving Oil Company installation and in 1958 he moved to the Hospital Services Commission of New Brunswick, Canada in the same capacity.

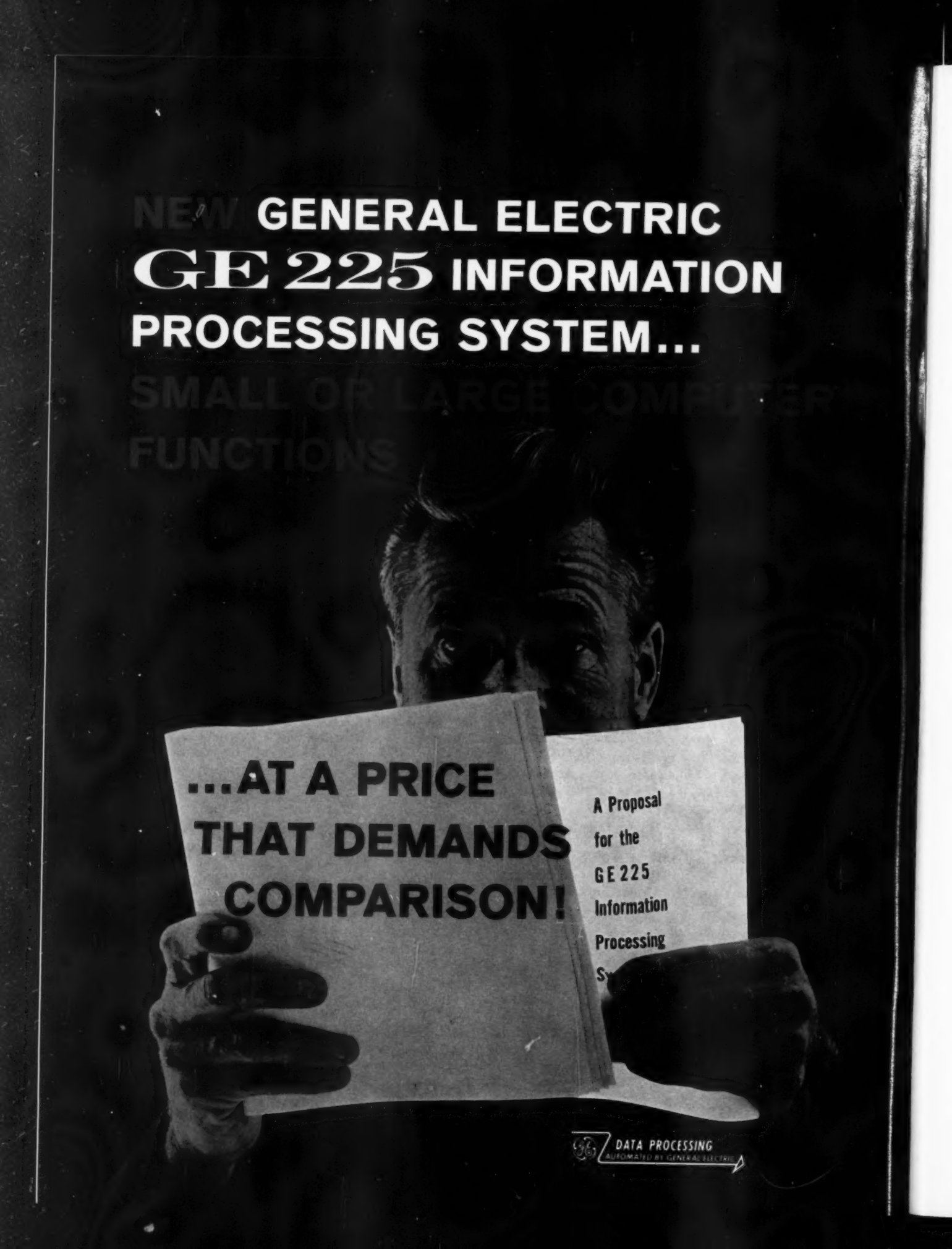
Mr. Brown is very active in the promotion of punched card principles and has successfully formed the Atlantic Provinces Chapter of the National Machine Accountants Association, of which he was elected president.

D. C. KERRIGAN ("YOU AND YOUR FORMS SUPPLIER") has been a career business forms salesman for the 22 years of his working life. He is president of Southern Systems & Forms, Inc., Greenville, S. C., which is a member of National Business Forms Associates, and which employs ten salesmen in North and South Carolina. Prior to the establishment of his own fast-growing firm of designers and suppliers of business forms, he was with The Standard Register Company for 20 years.

R. E. GOODWIN ("EASY CHANGE") is a native of New Brunswick, born in Sackville. He graduated from his university as a Certified Public Accountant. He is an auditor on the staff of the Comptrolling and Audit Branch of the Department of the Provincial Secretary-Treasurer of the Province of New Brunswick. He resides in Fredericton, N. B., with his wife and two children.

VAN THOMPSON ("A TRAINING COURSE IN DATA PROCESSING") attended Simpson College, Franklin College, and Indiana University. A twenty-eight-year-old Korean War veteran, he entered the data processing field upon discharge from the army in 1953, as an IBM operator-trainee at Arvin Industries, Inc., Columbus, Indiana.

In 1956 he was employed by Cummins Engine Company, Inc., also of Columbus, as a senior punched card and 650 console operator. He left Cummins in 1957 and has since been engaged in organizing and teaching training courses in business data processing at a government facility. ■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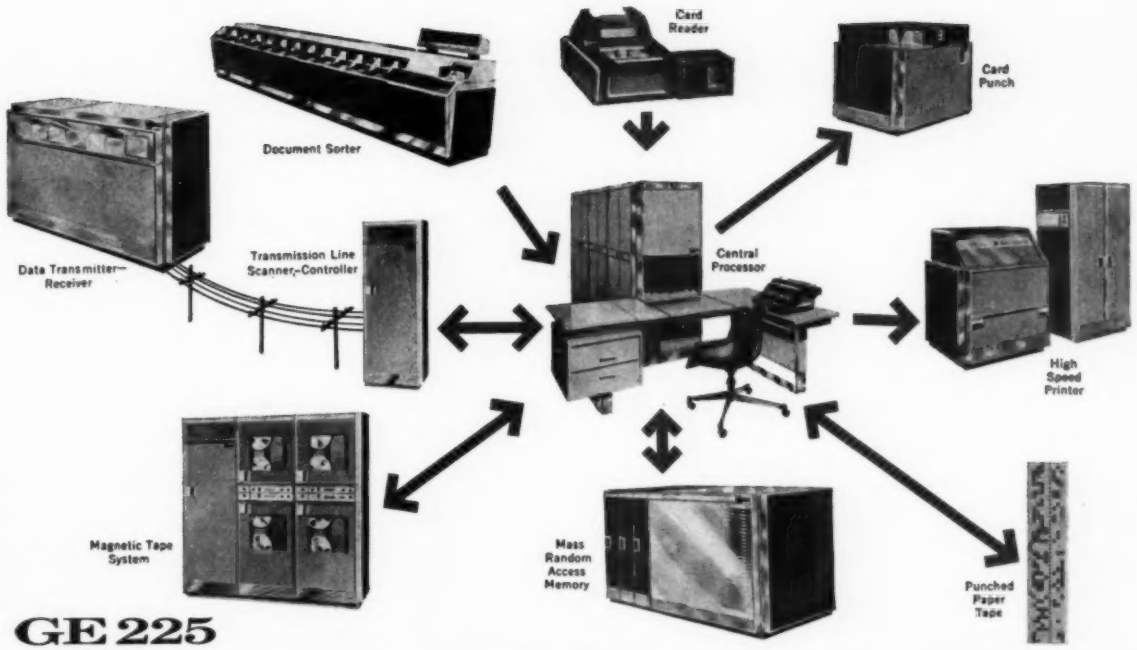

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Comments from Readers

Movie Fan

Berkley, Mich.

Dear Sirs:

Congratulations on your July issue. I particularly enjoyed the article on using photography in the punched card department ["Data Processing Time Study"].

John Davidson

More on Scope

Rock Island, Ill.

Dear Sir:

This Headquarters is engaged in the preparation of material for educational use at this installation.

Permission is requested to reproduce the following material for use as a course handout, *"The Scope of Data Processing,"* published in the April/May 1960 issue.

R. M. Ruud
Headquarters
Ordnance Weapons Command

Permission given. Ed.

Welcome Comment

Cincinnati, Ohio

Dear Sirs:

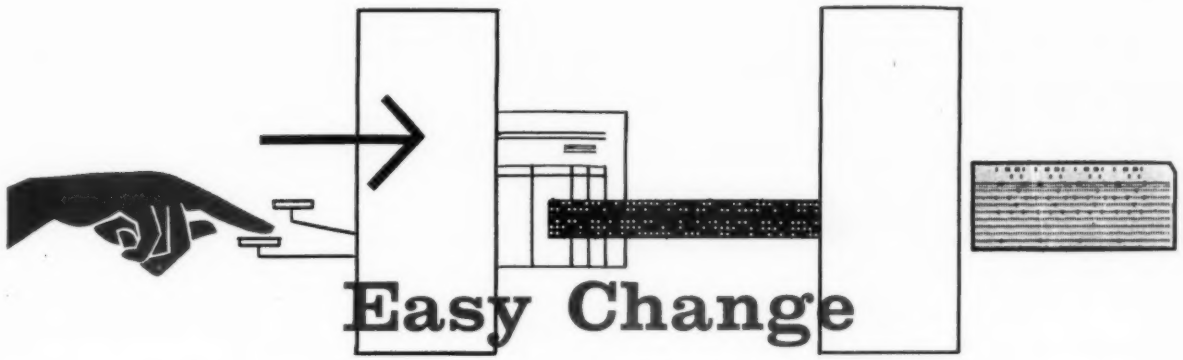
I certainly enjoy reading Data Processing each month, and feel that it is one of the greatest advancements itself in the field of data processing that has come along in the past decade.

Robert A. Link
Manager, Statistical Dept.
The Billboard

Editor's Note:

SEEN IN PRINT in the June issue made mention of "The Materials You Buy—Business Forms", *an article appearing in* New York Purchasing Review. *The author of this article is Albert F. Tiede, Sales Manager of Watts Business Forms. Reprints of his article are available from Watts, Styertowne Road, Allwood, Clifton, N. J.*

■ ■ ■



Easy Change

Government offices add punched paper tape to accounting.

By R. E. Goodwin

AS A COUNTERPUNCH in the struggle of eliminating the increasing volume of governmental accounting detail, the Province of New Brunswick made one major step towards that end by the simplification of amassing that great volume of detail for the yearly and official publication in what is known as The Public Accounts of the Province of New Brunswick. It was a *"blow"* from the accounting standpoint aimed directly at that mass of clerical detail. This step was accomplished by the effective use of ordinary accounting posting machines and punched paper tapes.

The change had its beginning in the mid 1950's with a search of the then available accounting equipment, including electronic equipment. Each suggestion was carefully weighed on its merits and its ability to meet the requirements. Cost or unwieldiness eliminated each in turn until punched paper tape emerged as a solution to the problem. Thus, the Province of New Brunswick became the first provincial government to make use of punched paper tape and, in fact, had one of the first accounting applications anywhere in Canada.

Easy Transition

The transition was a minimum of ordinary office upset, financial or otherwise. The equipment costs and necessary changes were small. Ordinary accounting posting machines were exchanged for accounting posting machines with tape perforators attached. To the already existing, but small, punched card installation one tape-to-card converter was added. No major change was made in routine procedures except that a vendor number and object classification coding was added to the existing applications for payments. Similarly, a revenue source code was given to revenue items.

The accounting machine operator found little change in the posting procedure. With the exception of the small amount of additional coding, nothing extra was added. As the operator proceeds with the normal general ledger posting, the tape is automatically punched with the desired information as a by-product. The daily tapes are then transmitted to the punched card installation where the tape-to-card converter automatically punches the card. The procedure thus results in a punched card with all necessary information initiated solely by a machine operator and as a by-product at that.

The present punched card contains the coding of the department incurring the expenditure, the account to be charged, the object classification of the expenditure made, the reference or warrant number, the vendor or supplier number, the amount of the expenditure and, of course, the date. Revenue items fit neatly into the above detail. Simple sorting and punched card accounting machine listings complete the detail for the public accounts.

Profit by Change

Nor did the results of the change end solely with the public accounts. Departmental administrators now have available information regarding suppliers and classification of both expenditures and revenue for analysis and control purposes which was never, or almost never before possible. In short, every department of the government felt and profited from this simple change.

The above application of the punched paper tape is only the forerunner of its ultimate use within the Province of New Brunswick. An application concerning payrolls has just been instituted and others are being planned for the not too distant future.

Although the change first appeared to be of a minor nature and in the main for one specific purpose, it ended in effect in a benefit for all departments concerned. No elaborate accounting equipment was necessary but in its place the Province of New Brunswick made use of an ordinary accounting posting machine, added a tape perforator and produced an amazing result. ■

Dashew Inaugurates New Marketing Concept

Individually owned network provides basis for sales and services of data processing equipment and supplies.

"AUTOMATIC DATA INPUT" is the term used by Dashew Business Machines, Inc. of Los Angeles, to describe machines which record data transactions at the source in mechanized form for subsequent data processing.

The essence of *"The Dashew Story"* is this:

All records begin with the *input* or original data. Up to now most of this input has been hand written, leading to problems of illegibility, transcription errors, high labor cost and delays in getting timely information. The hand written data has to be *"key stroked"* into a mechanized form such as punched cards, a fact which has created a bottleneck in data processing, sometimes resulting in delays and inaccuracies in the answers being produced by computers.

Dashew claims to have broken through the barrier of handwriting by developing and perfecting properly embossed and coded metal plates which offer the advantage of permanence, positive identification, error-free fast copying or reproduction by machine, and when combined with other information, punched or copied from other embossed plates, a method for mechanically feeding accurate original input information into computer systems.

The Printapunch is an example of a machine that captures source data. It produces punched transaction cards ready for processing into the computer directly from coded, embossed permanent identifier plates. When required, variable data determined at the source may be introduced by the worker into a keyboard, simpler than dialing a telephone. A permanent record is also produced which may be retained at the source.

Dashew researchers have developed materials containing the special properties that permit the effective use of the embossing and coding concept. The company offers a wide variety of metal or plastic plates and tags to be used as the input medium. They have trade-named these Dashaplates.

The company has developed a line of embossing machines which can produce up to 6,000 plates per hour. It has further developed a line of machines to transcribe or imprint embossed information from plates to accounting forms, receipts, purchase orders, inventory forms, etc.

Localized service centers

Dashew management believes that it has an important competitive advantage that should be exploited quickly and thoroughly. It feels further that the market for its type of data processing equipment is vast, covering almost every phase of business, industry, military and government. To accomplish this it has decided to build up a network of individually owned bureaus, which it calls Data Centers, to be operated on an exclusive territorial basis in all major markets in the United States. Dashew will then funnel all of its sales and services of equipment and supplies through these centers. The parent company will provide backing in terms of advertising and publicity, training, technical assistance and financial cooperation to permit handling orders of every size including lease and time payment plans.

The company estimates that a Data Center can be established in one of the smaller markets for as little as $7,000 investment. However, in the larger areas it might require as much as $50,000 or more. ■

Notable Quotes

"By taking samples of time, you can use the law of probability to give you reasonably accurate answers to many administrative questions. Your time samples tend to represent the true condition of the full-scale problem.

"If you are informed as to the probable true condition, you can make a better decision than you could without this information.

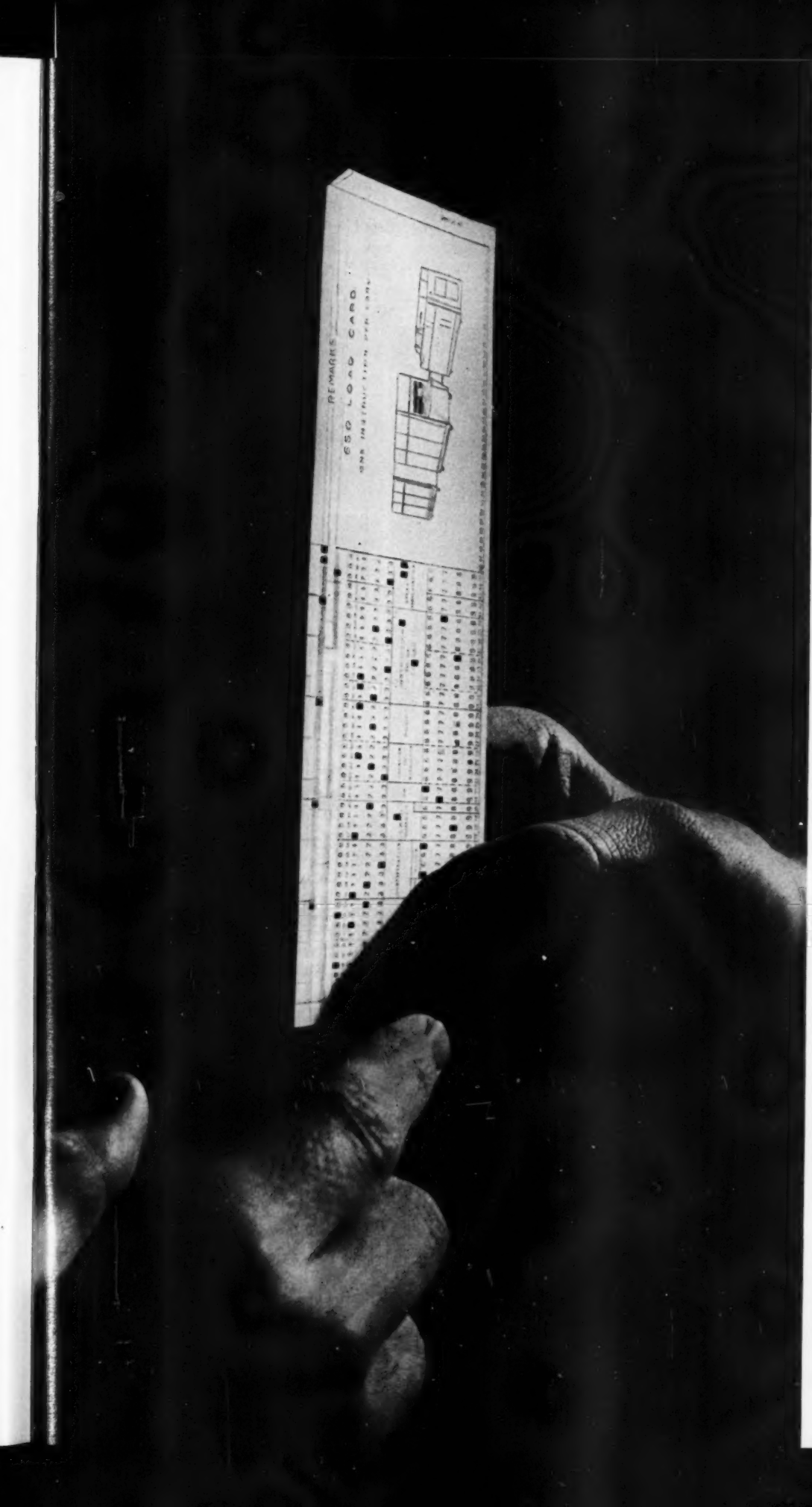
"Why take *samples?* Why not study the whole problem? You can't afford the time to examine the whole problem . . . to study the whole of *time* . . . the whole of *product* . . . the whole of a warehouse of *grain.*

"In administration, time is our major asset. You can take time samples inexpensively. Time sampling is called by other names, such as work sampling or ratio delay." *Systemation,* Number 24.

"There is one disadvantage to transfers [of personnel] which should not be overlooked. Sometimes you can become the victim of some other supervisor's operation house cleaning. It is only natural for supervisors to want to keep their better employees and to release their less satisfactory ones. What's worse—these people often have considerable seniority, which makes it difficult to relocate them or terminate them if they are unsatisfactory in machine accounting work. To prevent this, the qualifications of would-be transfers should be reviewed just as closely as those of applicants from the outside." Ward N. Adkins, *Journal of Machine Accounting,* July, 1960.

"The object of such research is to find reliable methods to pretest advertising campaigns, and to find general patterns, which can be expressed mathematically, of the ways in which customer populations react to advertising." A Gordon MacMillan, *Operations Research in Retailing,* Part II.

■ ■ ■



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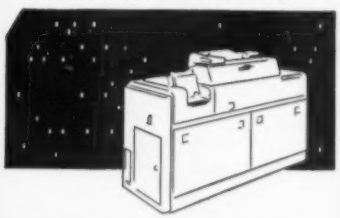
IBM's *warehousing service*—for customer and stock card forms—permits faster delivery and practically eliminates "out-of-stock" conditions in customer inventories. *Pool shipments*, for less-than-truckload card orders, are arranged automatically by IBM whenever possible. In addition, *emergency* service is always available. Whatever the format, quantity or delivery time required, IBM will do everything within its power to meet your needs. *Customer education* in the design, handling and care of punched cards is available through IBM's customer education centers, as well as through plant tours, supplies seminars and informative books and pamphlets.

The IBM card is backed by unmatched DESIGN and QUALITY, too. Through Card Design Centers . . . Sample Card Centers . . . manufacturing experience and quality control which are unparalleled in the industry . . . you receive the finest in card design and performance.

This special backing makes the IBM card a *value* unsurpassed in the industry . . . and represents one more example of the way IBM helps you to enjoy Balanced Data Processing.



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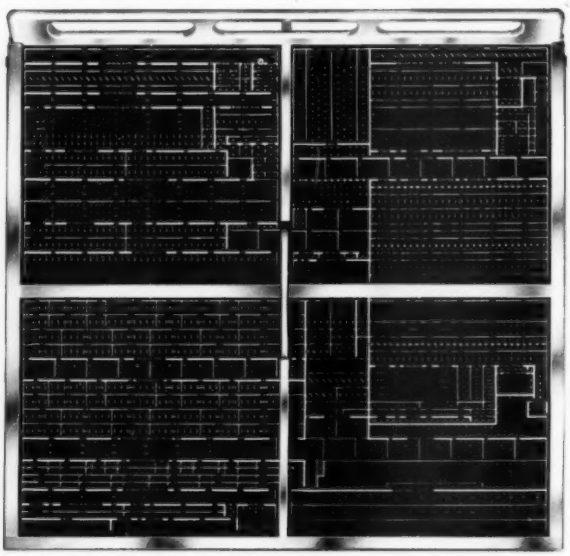


all panels are not the same!

This is a MAC Panel control panel, a product precisely engineered for use with IBM punched card and data processing equipment. And, there is a difference between this panel and others.

If you place another make of panel next to this one, both may look the same; lift still another panel and compare with this one and it may even feel the same.

Where, then, does the difference lie? Why is this MAC panel—or any MAC Panel product, for that matter, different from others? Wouldn't other panels be just as good if, in one instance, one had the same sharp appearance, another possibly felt as light and as easy to handle?

No! It takes more than just one or two qualities to make a good control panel. If other panels had all of the qualities, they would be just as good. But here's the important difference. *They don't!*

MAC PANEL MAC PANEL COMPANY

Inherent Quality

MAC Panels have all of the qualities that facilitate data processing procedures and insure accuracy. You can see some of these qualities: the sharp, legible diagram printing, the bright, burnished framing. And, you can feel the featherweight ease of handling. But it's the inherent features . . . the hidden facts that really tell the MAC Panel quality story.

FRAMES MAC Panel frames are made of the finest aluminum . . . extruded, then machined to closer tolerances than those normally required. In addition to providing a lighter, easier to manage panel, the use of aircraft aluminum adds assurance against bending, warping, or denting.

MAC even goes one step further. All frames are burnished to a high gloss. It looks good, but that's not the main reason. Burnishing is the best method for removing surface impurities. And because it is not a coating that can chip off, burnishing eliminates the possibility of excessive wear, rough edges, and a pitted, corroded appearance caused by oxidation.

Method and Metallurgy

HANDLES Here is an area of panel engineering that MAC considers important enough to utilize only the best resources. All MAC Panel handles, except the 402-3, are completely die-cast of modern aluminum alloys by people who know metals and casting methods. Complete casting means each top bar-handle is a one-piece unit. Handles merely screwed to the top bar create additional stress points where breakage is more likely to occur. These stress points can be best eliminated by a fully die-cast one-piece top bar-handle.

And, speaking of stress, why the "hump" in the middle of the 407 panel? For added strength. It's as simple as that . . . an "insurance hump". Without it, the chances of bending, breaking and warping are increased.

The Heart of the Matter

INSERTS These are the hearts of panels and for that reason MAC gives painstaking attention to even the minutest details. The insert in every panel you receive from MAC is completely molded of hard, durable, and proven material in MAC Panel's own molds. Not a paper-based substitute, but pure, shock- and warp-resistant phenolic. The holes are molded in at the same time. Not drilled later on.

MAC Panel research and testing proves that a molded insert guarantees uniform thickness, controls the precise spacing and size of holes . . . and, what's more important, molding seals the walls of each hole so that constant use will not enlarge the hole or allow warp-causing moisture to seep in.

Baked-on Printing

PRINTING Sharp, legible, *lasting* diagram printing is essential for long life and ease of wiring. The white, silk screened printing on jet black MAC panel inserts provides easy reading contrast. After printing, each insert is literally baked under infra-red heat to bond the ink to the insert, insuring that the legibility will last. This protection against chipping or scratching caused by constant wiring and re-wiring lengthens the life of your panel—increasing its value for you.

ASSEMBLY Quality control extends to the assembly of MAC panels. Strain-resistant, cadmium plated steel screws lock the panel parts together preventing misshaped panels. Electric torsion screw drivers firmly seat each screw with controlled pressure. Where extreme accuracy counts, set screws holding the insert into position are hand adjusted to assure proper tension.

TESTING In addition to inspections all down the line, every panel undergoes a thorough, final inspection. Flatness. Squareness. With wires and without. Every MAC panel is fitted in the enclosure mechanism from the machine for which it is designed. They're right before you use them.

PACKAGING Since all of the different parts that make up a MAC panel are the best, there's not much sense in skimping on packaging. Here, again, MAC Panel's research in conjunction with packaging specialists has nested MAC panels in the most effective packaging for maximum protection in transit. A panel is no better than the condition in which you receive it, and MAC Panel quality is guaranteed all the way.

What do These Differences Mean to You?

How, then, do you compare one panel with another? Not by sight or feel alone, but by knowing that the panels you use have all of the inherent qualities that assure reliability . . . by knowing that it is the hidden, built-in features of panels that can help your data processing operations.

These differences are the reason why MAC Panel Company continues to be America's leading independent control panel manufacturer. Be sure you use only the best. MAC panels.

Write today for this free booklet that shows you how important it is to know what to ask for when buying control panels. Better yet, ask your MAC Panel representative to demonstrate the benefits you get when you specify MAC panels and wires.

Circle No. 10 on Reader Service Card.

HIGH POINT, NORTH CAROLINA

Representatives throughout the United States, in Canada, and Latin America

MAC PANEL

NEWS SUMMARY

GENERAL

Financial Reports

Digitronics Corporation had net sales during the fiscal year ending March 31, 1960 totaling $822,000, a 50% increase over last year. New income per share was 10.2 cents as compared with 7.5 cents last year.

International Business Machines, for the six months ending June 30, netted $76,616,285 (*after estimated taxes*). This is equivalent for the period of $4.19 per share; last year it was $3.51 a share.

Burroughs Corporation upped both profits and revenues significantly for the first six months of 1960. New income after taxes increased 57% to $5,043,000 compared with $3,208,000 for the same period last year. Earnings went up to 76 cents a share; last year's were 49 cents for the same period.

Second quarter 1960 earnings for *Standard Register* were 13.9% above first quarter. First half earnings show net sales at an all time high of $28,095,124; net income of $1,322,899 is equivalent to $1.26 a share.

NEW APPLICATIONS

Banking Computers

Bendix entered into the banking application field with the installation of a G-15, AN-1, and 4 MTA-2's by the National Commercial Bank and Trust Company of Albany, N. Y. This is initially for *up-dating bank trust accounts.*

MICR Service Bureau

The General Electric Company is inaugurating the nation's first *MICR (magnetic ink character recognition) service bureau* in Phoenix, the first of what will be a chain of such bureaus in key metropolitan areas. The First National Bank of Arizona will share dual operation of the GE 210 at the Phoenix service bureau, and in a year will install their own 210.

Autonetics report leasing solid state Recomp computers to: Aerojet, for an open shop use for *engineering and science;* NASA *(National Aeronautics and Space Administration),* for computation of *rocket vehicle performance studies;* John E. Fast Co., for evaluations of *quality control* in the manufacture of capacitors; Argonne National Laboratories, for *atomic reaction calculations.*

The Texas Division of Collins Radio Company has been awarded a contract for over $5 million for *microwave link installations* to be used in the Federal Aviation Agency's long range radar program. This equipment is for radar surveillance for air traffic control to insure maximum air safety for the public traveling by air.

MILITARY

Bendix Corporation has been awarded a $2 million contract for an electronically controlled *battlefield position-fixing and navigation system,* dubbed *"PFNS".* The system will enable a field commander behind the lines to know the position of all units, including land and air vehicles and foot soldiers.

Collins Radio, Cedar Rapids Division, was awarded a $1,198,576 Air Force contract to supply single sideband *radio communication equipment* for the Strategic Air Command *(SAC).* As part of the world-wide communications system of SAC, Collins KWT6-5 transceivers *(radio receiver and transmitter in one unit)* will be used in sites 3,000 miles apart.

Missile Warning

Radio Corporation of America will deliver two systems for installation at the North American Air Defense Command (*Colorado Springs*) and SAC (*Omaha*). These systems will *process all signals from radar bases of* BMEWS at Greenland, Alaska, and England. This is to detect sneak attacks by ICBMs. Automatic processing of a missile attack from the moment of recognition of mass raid by the site computers to the display of threat information at NORAD and SAC takes about eight seconds. Individual missiles can be displayed at NORAD within three seconds after missile discrimination.

APPLICATION OF THE MONTH

Toll Collection

Punched card system counts vehicles.

A control booth on the *"Autostrada del Sol"*. The operator produces on the entry machine the punched card representing the ticket of the entering vehicle. The holes on the card show the class of the vehicle, the station number and other data.

LIKE MANY OF ITS AMERICAN COUNTERPARTS, Italy's 460-mile Autostrada del Sol, one of Europe's newest super-highways, has already become the busiest traffic artery in the country.

Built and operated by the Soc. Concessioni e Construzioni, the Autostrada has set a high standard of traveling speed, comfort and convenience. One of the most important factors behind this record is a punched card toll collection system that also provides comprehensive daily traffic statistics to management.

Studies of similar highways have invariably shown that actual traffic use soon exceeds projections, and the Autostrada's managers early recognized the need for such statistics, so as to plan maintenance and expansion intelligently.

The system developed for the Autostrada produces usage reports as a by-product of the daily toll audit. Automatic equipment at the toll booths records full information on every vehicle that enters or leaves the highway. This data is delivered each day to the Autostrada's headquarters, where an installation of Remington Rand punched card machines prepares the audits and statistical reports.

Beginning of procedure

The toll audit procedure begins at the specially-equipped entrance and exit booths. At each of these along the highway are an automatic axle-counting treadle, a key punch ticket machine, and a remote-control recorder.

As a vehicle enters a booth, its wheels activate the treadle, which registers the number of axles. The collector then issues the driver a ticket from the key punch machine which shows, both in print and perforations, the booth number, the toll rate and the axle count.

Every hour the information sensed by the treadle and the data entered by the collector in the ticket machine is automatically transmitted to the remote-control recorder, which prints both sets of figures on continuous paper tape. This results in a dual record of every transaction and is virtually error-proof.

As each toll collector comes on duty, he inserts his specially-numbered key into the recorder and removes it at the end of his shift. His number appears on the tape for all his transactions, and thus enables management to keep track of each man's area of responsibility.

Both the treadle and the recorder are powered by storage batteries to insure continued operation in case of a general power failure. A central clock system governs the printing of the exact hour of issue, cancellation of tickets, and the hourly summary of the recorders.

The exit booths contain the same three units, with much the same functions, except that the punched card ticket surrendered by the driver is here inserted into the key punch machine, which records the exit booth number and cancels the ticket.

Daily activity

Each day the recorder tape, cancelled tickets and cash receipts list are picked up and delivered to the central data processing department, where the daily toll audit is processed.

The tapes and cash lists go to the operator of a Synchro-Matic punch unit, which consists of an

(continued on next page)

accounting machine synchronized with a punch. It handles three separate jobs:

It calculates net totals of axles and receipts from the tapes and cash lists; simultaneously, it automatically punches these totals into the collectors' tour-of-duty cards to be used for the next step in the procedure; and, at intervals of two weeks, it is used to prepare the collectors' ledger cards recording totals for the entire period. The cards punched in this work are then used in further machine processing.

Each collector's tickets for the day are put through the electronic sorter with the master file cards containing tolls and mileage for each combination of entrance, exit and vehicle class. Master cards for which there are no matching tickets are automatically segregated and returned to the file. The sorter operates at a rate of up to 800 cards per minute.

Each collector's tour-of-duty card is then placed ahead of his deck of tickets and master cards, and the entire batch processed on the tabulator, which completes the next two steps of the procedure at the rate of 100 lines per minute.

It produces a printed report, the toll collectors' summary, which is the full record of the day's toll collection activities. The summary enables the accounting department to maintain up-to-the-minute control over every transaction at the Autostrada's toll booths.

Reports made available

At the same time, the tabulator creates a new set of cards, the statistical summary cards. These are the raw material for an infinite variety of management reports. Combined with statistical summary cards covering periods of a month, six months or a year, they can be sorted and listed to give planners a vivid picture of overall highway usage.

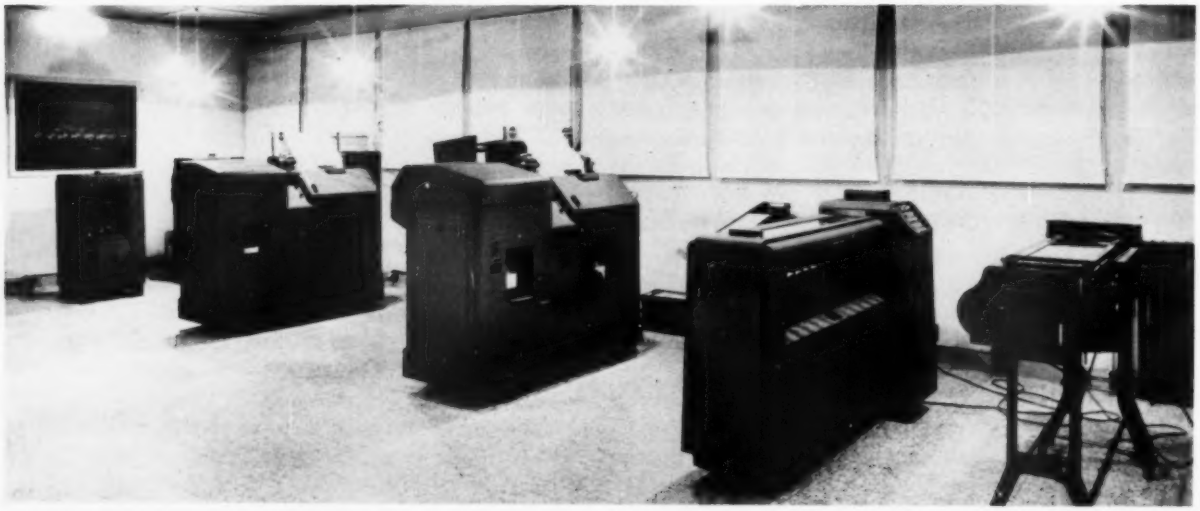
Inauguration of the Milan-Bologna section of the *"Autostrada del Sol."* Attending the ceremony was the Italian President of the Republic, Hon. G. Gronchi *(first row, second from left).*

The department is currently calculating class-of-vehicle reports, directional traffic distribution reports, and entry and exit figures, and other breakdowns will be developed as they are needed.

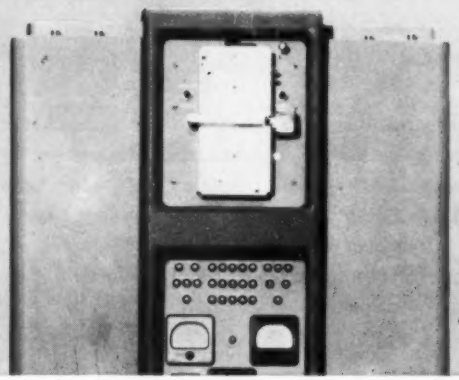
After printing, the original sets of cards are again put through the sorter to separate tickets, master cards and tour-of-duty cards for filing. The master cards can be used again and again. This completes the procedure.

This punched card toll road system is modeled after a number of similar machine installations at work in various countries, including the United States. It has already proven its value in the smooth operation of the Autostrada. By furnishing management with the information it needs to adapt the highway to the changing needs of its users in the years to come, it is expected to be increasingly useful in the future. ■

Partial section of the Data Processing center of the *"Autostrada del Sol."*



"Our study showed the Bendix G-15 computer will save us $100,000 a year"



Walter T. Jones, Jr.

WALTER T. JONES, JR.
MANAGER, COMPUTING AND ACCOUNTING DEPARTMENT
QUEEN KNITTING MILLS, INC.,
PHILADELPHIA

Queen Knitting Mills has massive production and inventory control problems . . . the kind usually handled on medium to high-price computers. After a detailed study, however, Queen selected the low-cost Bendix G-15. *"It does the whole job for us,"* says Mr. Jones, *"at one-half the cost of competitive equipment."*

As one of America's largest manufacturers of women's summer sportswear, Queen Knitting Mills will save $100,000 per year by eliminating overstock and loss of sales due to understock. In analyzing the G-15, Queen considered these features:

EXPANDABILITY The G-15 is the only low-cost computer that provides magnetic tape units, and can accept paper tape punched by various office accounting machines. Addition of the G-15 Punched Card Coupler makes the computer the lowest-cost punched card computer system available. The basic G-15, however, is a complete operating computer. It comes equipped with an alphanumeric typewriter, a paper tape punch, and a photoelectric paper tape reader.

VERSATILITY & RELIABILITY There are more than 250 G-15's installed, handling an extremely wide variety of business and scientific problems. "Uptime" for all these machines has been better than 95%.

SPEED Queen's study showed the G-15 is faster than other computers in its price range. *Delivery speed* is excellent, too.

Write for complete details.

Bendix Computer Division
DEPT. AE 26 LOS ANGELES 45, CALIF.

Bendix COMPUTER DIVISION

Circle No. 11 on Reader Service Card.

New from Royal Precision... RPC-9000

THE LOWEST-PRICED COMPLETE DATA PROCESSING SYSTEM ON THE MARKET TODAY!

Economical design: The new, completely-transistorized RPC-9000 is designed for serial mode of operation. This feature utilizing magnetostrictive delay lines for high-speed memory permits great reduction in original equipment costs. Tape transports using continuously revolving loops of magnetic tape rather than "start-and-stop" techniques further cut initial investment.

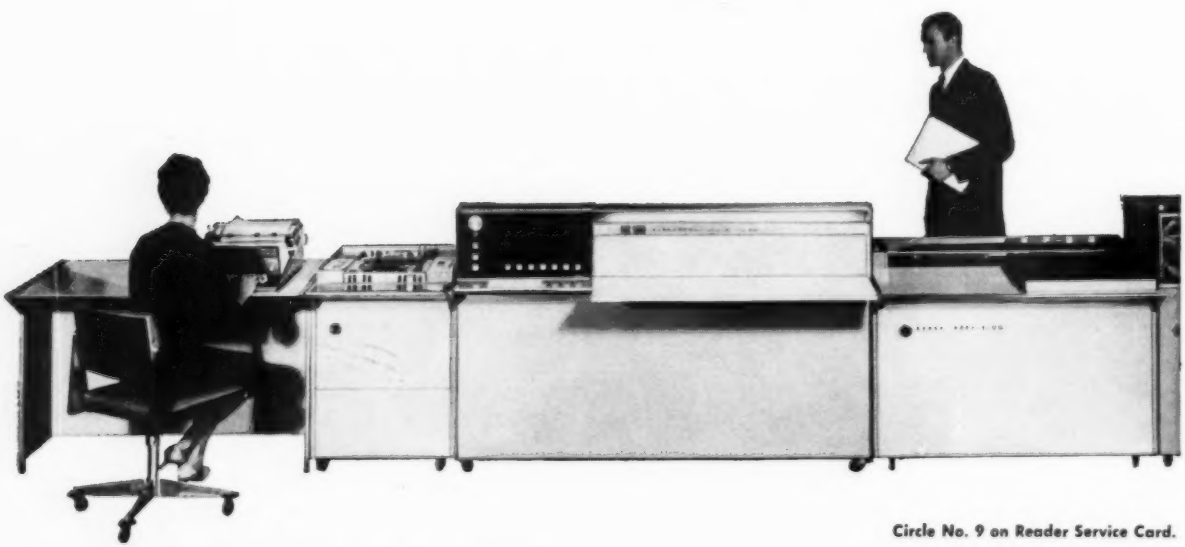
Efficient operation: The RPC-9000 processes data "in line." Data are accepted in random order, and all affected records are automatically updated in a single uninterrupted sequence of operations. No batching or sorting is necessary. Data are recognized by content, not location. This eliminates the need for location codes, and allows efficient utilization of storage capacity. Eight separate records are searched simultaneously. Completely buffered input-output permits simultaneous operation of all system components.

Tailored to your needs: With the RPC-9000 you buy the exact amount of data processing you require. Start with the basic system—computer, tape-typewriter, magnetic tape storage unit. Then, as your volume grows, you can add high-speed paper-tape punches and readers; punched card readers; line printers; additional tape typewriters; more magnetic tape cartridges; more internal memory. You can operate up to 30 of these devices at the same time.

Economical in use: The RPC-9000 is designed for ease of operation and maintenance. It uses power from any ordinary wall outlet, requires no air conditioning or site preparation. This low-cost system will perform the full range of your data processing needs. See your nearby Royal McBee Data Processing Systems Sales Representative without delay, or write to the address below for comprehensive brochure.

Royal Precision Corporation

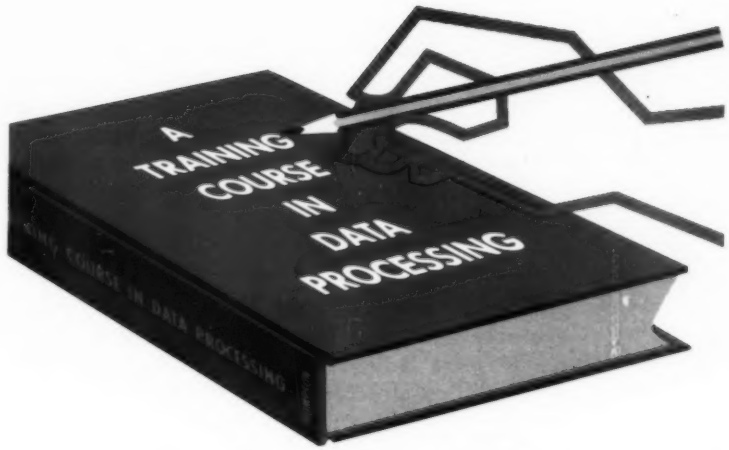
Royal Precision—producers of the LGP-30, the RPC-4000 and the RPC-9000—is jointly owned by the Royal McBee and General Precision Equipment Corporations. Sales and service are available coast-to-coast, in Canada and abroad through Royal McBee Data Processing Offices.



Circle No. 9 on Reader Service Card.

MARKETED BY ROYAL McBEE, DATA PROCESSING DIVISION, PORT CHESTER, N. Y.

If you have sales ability, and are interested in electronic data processing contact your nearest Royal McBee Data Processing Office, or write Sales Administration Director, Royal McBee Corporation, Port Chester, New York.



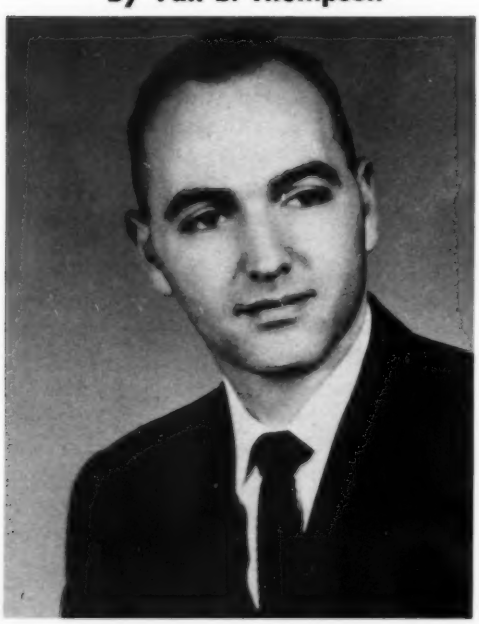
COVER FEATURE

A Training Course in Data Processing

Computer programmers and analysts must go beyond punched card training.

IN THE EVER-CHANGING FIELD of business data processing, a major factor to be considered by management in any assessment of a proposed system is personnel training. This has long been the case with punched card systems, but the increasing rate of technical development and the greater costs and capacities of the electronic data processing tools which have been put into the market in the last decade, have intensified the problem. Prior to 1950, the slower rate of change in the punched card field, coupled with a combination of on-the-job training and schooling conducted by the equipment manufacturers, seems to have adequately taken care of training needs, on both the operating and planning levels. In the case of electronic data processing systems, however, it is the opinion of this author that we are still in such a period of adjustment that the approach to personnel training has not yet been stabilized.

By Van B. Thompson



No one can deny that people are being trained to program business applications for electronic computers. Many colleges and universities offer computer programming as a part of the business curriculum, and this may in the future become the major source of business programming personnel.[1] Correspondence schools, business schools, the armed services, even some high schools offer some training. But at present the methods of the punched card era are being applied to this problem: the user and the manufacturer of the equipment share both the responsibility and the active task of training most programming personnel.[2]

There seems to be general agreement that without intelligent planning by trained personnel, even the most extensive electronic computing system is useless. In this very critical area, each user is left pretty much to itself in the matter of setting up a workable training program. Reliance on the equipment manufacturer may be satisfactory for technical aspects but leaves out the individualized approach, stressing the user-company's philosophy toward data processing, which is possible when the user develops its own program in which both technical data and management's views are presented in an integrated fashion.

The following is an outline of a training course designed for individuals who have had no prior knowledge of punched card or computer equipment and methods. It may serve to stimulate thinking in a company interested in setting up such a program

[1] *A Study of the Immediate and Future Needs of the Pennsylvania State University for Electronic Digital Computer Facilities*, Bartoo, J. B., and F. R. Hartman, July 1, 1959.

[2] Ibid.

to accommodate either or both of two types of trainees: individuals who seek assignment in the data processing structure as operators or planners, and management personnel seeking a working knowledge of the field as a means to better communications and improved management skills.

The course is built around a specific set of machines: certain basic IBM punched card equipment, and the IBM Type 650 electronic computer. The author feels that the same basic approach and organization may be useful with a different machine complement. Occasional access to the machines studied is highly desirable, but the course may also be taught in a meaningful way without the use of any equipment.

BUSINESS DATA PROCESSING

I. Viewpoint and Objectives.

The general objectives of the course are: **(1)** to provide basic planning skills in the use of punched card equipment and, through reference to the 650, electronic computers; and **(2)** to develop in the student a grasp of the philosophy of data processing, with emphasis on the use of the equipment to further the goals of management.

II. Length of Training.

The course requires 130 classroom hours *(recommended: one hour daily, five days per week, twenty-six weeks)*, with about 150 hours of outside reading and problem assignments. While increasing the number of hours of daily classroom work could theoretically reduce the time required for training to as little as slightly over sixteen days, it is suggested that a minimum of at least two months be allowed for the course, for proper assimilation of ideas.

III. Selection of the Instructor.

The course instructor may be chosen from the company's systems staff, data processing analyst or supervisory staff, programming staff *(if there is one)*, or other company area. Qualified persons from outside the company, such as instructors in this field from nearby colleges, management consultants, etc., could be used. This, of course, presupposes that the company will do its own training, rather than relying on the equipment manufacturer; but the latter could be called upon to provide instruction in specific course units or sub-units.

IV. Selection of Trainees.

Each company must determine its own specifications for data processing personnel. In many cases, it will be desirable to select trainees from specific applications areas within the company. A very useful tool is the *"Aptitude Test for E.D.P.M. Programmers,"* available through IBM. While the aptitude test referred to measures the specific kind of intelligence best suited to the job, the author feels that general intelligence tests are useful when available, and that a minimum I.Q. of 110 should be set. The author also feels that at least two years of college be required of prospective programmers. Management personnel taking the course as an aid to communication may be selected by these or other criteria.

V. Course Outline.

NOTE: In the following detailed outline, texts, manuals, and other materials which each student requires are indicated by a double asterisk (**). Materials required for reference *(one copy)* are indicated by a single asterisk (*). The times expressed in weeks assume five hours of classroom work per week.

UNIT I:

A Survey of the Data Processing Problem. 10 hours, 2 weeks.

****Introduction to Data Processing;** Haskins and Sells, 1957.

****An Introduction to Electronic Data Processing,** Martin, E. W.; Richard D. Irwin, Inc., Homewood, Illinois, 1960.

(This new text is scheduled for publication in December, 1960. The title at publication may differ from the tentative title given here. The author of this article is familiar with Dr. Martin's excellent forthcoming text through use of the material, in mimeographed form, as a syllabus in the course described herein.)

*Selected reading assignments from Appendix A, to include **An Economist Looks at Data Processing,** by H. J. Greenfield.

The history of data processing from earliest times. A review of past and present devices. A preview of punched card and computer methods. The concept of an organization; problems of coordination and control. The concepts of the feedback loop, management by exception, and integrated data processing.

UNIT II:

The Punched Card Method. 70 hours, 14 weeks.

Basic text: **An Introduction to Electronic Data Processing, Martin, E. W.

IIA:

General Principles. 15 hours, 3 weeks.

**IBM Flow Chart Template, Form X24-5884-5.
**IBM Card Layout Form, Form X74-4049-12.
**IBM Multiple Layout Form, Form X74-4823-3.
*Selected readings from IBM management series

(continued on next page)

manuals on card design, procedure development, and scheduling.

The IBM card; the unit record approach. Preview of control of punched card equipment. Machine functions, speeds, costs. Procedure planning. Flow charting; time estimates; cost estimates. Description of a payroll procedure *(Martin)*. Class project: sales analysis procedure *(Martin)*.

IIB:

Keypunching, Verifying and Sorting. 5 hours, 1 week

**IBM 082 Sorter, *Principles of Operation*, Form 22-3177-3.

Entry of data into the system. Verification techniques. Operation of the sorter. Sorting techniques.

IIC:

Interpreting. 7 hours, 1 week and 2 days.

**IBM 552 Interpreter, *Principles of Operation*, Form 22-3178-3.

**IBM 552 wiring diagrams, Form X24-9098-7.

Interpreting. File maintenance. Tub files and bin tags. A first look at the selector.

IID:

Reproducing and Gang Punching. 3 hours, 3 days.

**IBM 514 Reproducer, *Principles of Operation*, Form 22-3180-3.

**IBM 514 wiring diagrams, Form X24-9188-9.

Straight reproducing, gang punching, and comparing. Selection. The 80-80 board.

IIE:

Collating. 10 hours, 2 weeks.

**IBM 077 Collator, *Manual of Operation*, Form 22-3185-3.

**IBM 077 wiring diagrams, Form X24-9133-11.

Primary and secondary feeds. Reading stations and comparing units. Flexibility of control. Sequence checking, merging, matching, combined operations. Problems utilizing the collator.

IIF:

Accounting Machine. 20 hours, 4 weeks.

**IBM 407 Accounting Machine, *Manual of Operation*, Form 22-5765-8.

**IBM 407 wiring diagrams/planning charts, Form X24-6421-0.

Discussion of tape-controlled carriage. Basic wiring and interpretation of timing chart in this order of presentation:

Detail printing
Space control
Addition
Program control
Group printing
Subtraction
Zero and special symbol control
X selection
Digit selection
Character emitter printing
Print selection
Group indication
Counter coupling
Alteration switches
Field, class, and symbol selection
Multiple X selection
Total transfer
Summary punching.

IIG:

Calculating. 10 hours, 2 weeks.

**IBM 604, *Manual of Operation*, Form 22-5279-10.

**IBM 604 wiring diagrams/planning charts, Form X26-9322-6.

Basic wiring and timing chart:

Crossfooting
Multiplication
Group multiplication
Division
Successive calculation; storage assignment
Sign control
Checking multiplication
Summary punching.

This sub-unit should be presented in context with the EDP functional terms to be used in studying the 650 computer; e.g., input, output, memory, arithmetic, control.

UNIT III:

Electronic Computers; Programming the IBM 650. 50 hours, 10 weeks.

Basic text: **An Introduction to Electronic Data Processing, Martin, E. W.

****General Information, Console Operation, Special Devices;** IBM 650 DPS Bulletin G24-5000.

****533 Card Read Punch, 537 Card Read Punch, 407 Accounting Machine;** IBM 650 DPS Bulletin G24-5001.

****Basic Operation Codes, Program Optimizing, Program Loading;** IBM 650 DPS Bulletin G-24-5002.

****IBM Magnetic Drum Data Processing Machine, Type 650, Practice Exercises;** Form 22-6215-1.

****IBM 533 wiring diagrams,** Form X24-6207-2.

***Planning for IBM 650 Card Systems;** General Information Manual, Form F28-4016.

***Programming the IBM 650 Magnetic Drum Computer and Data Processing Machine**, Andree, Richard V.; Henry Holt and Company, 1958.

***How the Computing System Works for You;** Educational Series, #1, Remington Rand Univac, Form U 1275 A.

***Programming — A New Profession for You;** Educational Series, #2, Remington Rand Univac, Form U 1555.

The organization of this fifty-hour unit follows Dr. Martin's text. The five/ten method of rough optimization is used (see Andree). Primary emphasis is placed on problem definition and block diagramming, with coding based on the block diagrams (see Martin). *"Elegant"* optimizing and SOAP II are not included in this basic unit, but should follow immediately for those individuals who will be actively engaged in programming. Selected problems from IBM's *Practice Exercises*, Martin, and Andree are used. The final problem assignment should be comparable to Problem 7.13 in Martin.

Data Processing As A Means

The final five hours should be devoted to a sum-

marization of the *principles* learned during the entire course, with re-emphasis of the *role* of data processing as a means to better management, rather than as an end in itself. Although it is difficult to show in an outline of this sort, continual emphasis should be placed on management problems throughout the course, in balance with the technical instruction. Above all, care must be exercised to avoid stressing technique for its own sake; rather the "*why*" of each new technique should be given considerable weight. This is true, the author believes, even for trainees scheduled for operator positions. Technique can be developed through on-the-job supervision; but in the long run, a broad understanding of methods and theory should prove more valuable to the individual and to the company.

Unit and Sub-Unit Tests

UNIT I

1. Define "data".
2. List some of the reasons for the present need for more automatic and faster data processing systems and machines; that is, why is data processing a bigger job today than it was, say, one hundred years ago in the U. S.?
3. Which worker in the U. S. is apt to be more productive, white collar or blue collar? Why?
4. Haskins and Sells describe the basic data processing procedures as:
   1._____; 2._____; 3._____
   . . . which are accomplished by which six basic operations?
5. Needs for data may originate either from external sources or from within the organization; likewise, the sources of data may be either external or internal. Give an example of a document or report . . .
   a. which must be produced for use by someone outside your own business organization:
   b. which must be produced for use within your own organization:
   c. in which the data to be operated upon originates within your own organization:
   d. in which the data to be operated upon comes into your organization from the outside:
6. Haskins and Sells state that numeric classification codes are preferable to alphabetic codes. From your knowledge of the IBM card and the IBM card sorter, can you give one possible reason for this preference?
7. The principle of the feedback control loop is one which is often applied to management's control over the operations of the business. How can the use of punched card and computer methods make management control more effective?
8. Describe the McBee keysort code. Which operating step is speeded up the most by use of the keysort card?
9. Why do Haskins and Sells include filing as a "recording" operation? Doesn't "recording" consist only of writing and rewriting?
10. How many holes are required to represent a digit on an IBM card? How many holes are required to represent a letter of the alphabet?
11. The IBM card sorter uses the reverse-digit method of sorting. Show the reverse-digit method of sorting the following (listing 1st, 2nd and 3rd sort):
    Original sequences—398, 050, 678, 315, 802, 007, 357, 147, 692, 593, 048, 618, 505, 307, 173, 012, 852, 197, 642, 098, 543, and 075.
12. What is the major drawback to use of the 5-channel Teletype code for transmission of data?
13. Both the IBM 705 and the Remington Rand Univac large-scale electronic data processing systems use a seven-channel magnetic tape to read and write data. In the IBM system, what is the seventh (top) channel used for? How is this accomplished?
14. How does an electronic computer "make decisions" during the processing of data?
15. Punched card machines are instructed by use of:
    Electronic computers are instructed by use of:
16. List the media presently available for representing data in electronic systems.
17. In addition to media and equipment, what other areas require study in considering an integration of an organization's data processing activities?
18. List some of the management aids to control and direction of data processing activities.

UNIT IIA (See Martin for sales analysis procedure class exercise for this unit.)

UNIT IIB

1. How many pockets are there in an IBM card sorter?
2. The IBM 082 card sorter operates at a speed of:
   200, 400, 450, 600, 650, 1,000 cards per minute? (Circle one.)
3. You have 30,000 detail parts activity cards to be used in a parts pricing application. The part number code used consists of eight digits plus a two-letter alphabetic suffix. In all cards used in this job the part number field is cc 1-10, with digits in cc 1-8 and the alphabetic suffix in cc 9-10. The other deck used in this job is a parts pricing master deck. The master deck is identified by an X in cc 80; the details are blank in cc 80.
   One of the first operations in this procedure calls for sorting the details (which show parts activity code and quantity to part number, so that the details and masters may be merged. Assuming that you have only one 082 sorter available and do not block sort . . .
   a. Which column would you sort first?
   b. Which column would you sort last?
   c. How many passes through the sorter would be required?
   d. How long would it take? (Show your figuring.)
4. Later in the above application—after you have merged the details and masters, calculated parts activity dollar amounts, and run a report on the 407 accounting machine—you want to replace the master deck in a filing cabinet for future use. How can you separate the masters from the details? How long should it take? (Show your figuring.)
5. What is meant by block sorting? What advantages may sometimes be gained through this technique?

UNIT IIC

(Note: Interpreter wiring diagrams may be used for reference.)

1. In normal interpreting jobs, where you simply want to interpret the same fields in the same way in all cards, you would wire from _____ to _____.
2. On the interpreter control panel, what name is given to the column split section?
3. Describe at least one use of this section of the control panel.
4. What is meant by the term, split wiring?
5. How many positions are there in an interpreter selector unit?
6. What kind of punch is used to pick up a selector on the interpreter?
7. Can you use any other kind of punch to pick up an interpreter selector?
8. In addition to the pickup, what possible entry hubs are found in the selector section of the control panel?
9. What hubs can be exits from the selector?
10. What connections would you make on the control panel if you wanted to read the first ten columns of a card and print the field through the last ten type bars?

UNIT IID

(No test over this short sub-unit.)

UNIT IIE

1. A collator, without extra attachments, can do the following things: (Circle or underline your choices.)
   a. Check the sequence of a file of cards.
   b. Pull out of a file all cards that have all zeroes in the control field.
   c. Print on cards.
   d. Merge two files of cards into one.
   e. Multiply.
   f. Add and subtract.
   g. Divide.
   h. Economically sort cards with large sorting keys.
   i. Pull from one file all cards that are not equal, in the control fields, to any card in the other file.
   j. Print information on continuous paper forms.
   k. Match two files, pulling out of the files unequal cards, without merging the two files together.
   l. Pull out of an unsorted file all cards in which the number in the control field is lower than a specified limit.
2. On the accompanying wiring diagram, wire a collator to do the following job:

GIVEN:

a. A master deck of parts pricing cards, showing the unit price of each kind of part used in a manufacturing process. Part number is in card columns 11-18; unit price is in cc 25-30. The cards are supposed to be in part number order. There are 1,400 of these cards, one master card for each of 1,400 different parts currently in use.

b. 10,000 detail usage cards, collected and keypunched during the last week. Each card shows part number in cc 11-18, and the quantity used in cc 20-24. We do not know how many of the 1,400 kinds of parts are represented in the 10,000 detail usage cards. The detail cards have just been sorted to part number.

REQUIRED:

We want to wire a board that will allow us to sequence check the details, and then to merge the details behind the masters while sequence checking the masters. Also, we want to select, while merging, those detail cards for which there is no master (this would indicate our master deck may not be up to date), and those masters for which there are no details (which probably means simply that some of our master parts had no activity during the period).

Please show a time estimate, with your figuring, for this operation.

UNIT IIF

1. How many reading stations are there in a 407 accounting machine?
2. In a 407, are cards read as they pass through a reading station or while they are standing still at a reading station?
3. Control punches, such as an X punch, which are used to pick up selectors and storage units and in other ways control the use of data from the card, are usually read at which reading station?
4. When summary punching, which will occur first, total printing or punching?
5. Name two other cycles on a 407 besides card cycles.
6. Is it possible to single space a report on a 407? Double space? Triple space?
7. There are four classes of totals that can be accumulated on a 407 without using Special Program. What are they called?
8. Why do we have to wire "CI to C" (Carry Exit to Carry Entry) for each counter group we are using?
9. We have a file of 1,000 cost cards, including a group for each of the 25 departments in our business. We wire the 407 to take two kinds of totals: a total for each department, and an over-all total. The cards are in sequence by department number. If we wire the 407 so that department totals will accumulate in counter 8A, and the over-all total will accumulate in counter 8B by means of Total Transfer ("rolling") . . .
   a. How many times will amounts **add into** counter 8A?
   b. How many times will amounts **add into** counter 8B?
   c. How many times will totals **read out** of counter 8A?
   d. How many times will totals **read out** of counter 8B?
10. 407 wiring problem.

GIVEN:

We have given each employee a battery of five aptitude and intelligence tests. The highest score possible for each of these tests is 100. The tests are identified as Tests # 1, 2, 3, 4, and 5. We have graded the tests, and have punched five cards for each employee (one per test per employee) as follows:

Employee number—card columns 1-5
Test number—card column 6
Test score—card columns 7-9

We have sorted the cards to test number, and then to employee number.

REQUIRED:

Wire a 407 panel that will . . .

1. List each card, showing employee number, test number, and test score.
2. Show the total score(all five tests)for each employee.

When you have finished, check your panel to be sure you have left nothing out.

UNIT IIG

DISCUSSION:

In any business, planning is important. In a manufacturing business, among other things it is necessary to plan in advance so that enough materials are on hand when they are needed to complete a production schedule without running out of anything. If our plans and figures are right, we ought to be able to predict shortages in advance, in time to prevent these shortages by ordering the parts or materials we need. This is the purpose of a shortage report, in which we compare (1) the balance on hand of each part, plus the **on order** amounts of that part which are scheduled to arrive at our plant during the production period, and (2) the actual quantity of the part that will be needed during the period in order to complete our production schedule. In the following problem, we are using a thirty-day period.

GIVEN:

A single card for each separate kind of part used by the company in its production processes, containing:

Part number—card columns 1-10
Current in-plant (on hand) balance—card columns 21-25
30-day on-order scheduled receipts—card columns 31-35
30-day production schedule requirements—card columns 41-45

REQUIRED:

For each card, calculate and punch a balance for the end of the 30-day period.

Use card column 51 as the high-order column of your result field.

A plus amount in cc 51-? will indicate that there will be no shortage of that part during the 30-day period.

A minus amount in cc 51-? will represent the amount of shortage that will occur during the 30-day period. If the company is to maintain its own production schedule (that is, follow its own plans), the purchasing department will have to get busy and put in an order for more parts.

UNIT III

The problems given in Dr. Martin's text, which may be supplemented from Andree and IBM's **Practice Exercises**, serve as a check on trainee progress in this unit.

Marien on FORMS **–A Monthly Feature**

Business Forms of the Future

RAY MARIEN

ONE OF THE "ADVANTAGES" of owning a TV set is that it enables some of us to see movies that we deliberately missed 20 years ago. Not that we couldn't find parking space for our tricycles, but merely because a quarter was too precious in those days to spend it on "*B*" pictures.

Anyway, what this is all leading up to is that one of those quickly forgettable "*epics*" occupied our time the other evening on the 16" screen. It had to do with a young man who could look into the future. Not very far, mind you, only *one* day, but that was enough. It enabled him to become quite the local hero until the time came when his "*look*" foretold his own sudden demise the next day. That's what he got for being nosey, I guess.

Rather than bore you with the rest of the plot, I'll make my point now. I recently attempted a survey of several large printing companies to find out what they thought business forms of the future would look like. Lo and behold, their crystal balls suddenly became very cloudy. Only two of them were bold enough to venture a few guesses. I suppose some of them might have felt they'd be giving away secrets to their competition. On the other hand, maybe they saw the same ancient movie I did and decided that looking into the future was a risky business.

One of the brave ones who stuck his neck out was T. W. Richards, advertising manager of Baltimore Business Forms Company. Mr. Richards stressed the heavy burden placed on paper manufacturers because of the increasingly higher speed printers used in data processing. He foresees a need for extremely strong forms paper that will have to withstand a tremendous amount of heat created by the friction resulting from rapid paper flow.

He also anticipates printing papers and duplicating masters that will give clearer and longer lasting copies.

Mr. Richards adds another very interesting observation, and here we quote:

"With automatic accounting growing at such a rapid rate, it is possible that every American, individual or industry or institution, will be given a number at birth—a number which will be his identification throughout life. In the case of an individual this would be his school number, social security number, army number, charge account number, banking number, etc. This number may be reproduced on such records as charge accounts, checks, bank deposits, etc., so that mechanical machines can handle the processing of accounting work at tremendous speeds. The number may even be coded so that it helps get mail delivered faster, and even give an individual's occupation for the purposes of better communications. This would tie in the forms work in headings, account numbers, etc."

Another stouthearted fellow who ventured forth with his views of the future developments in the business forms field is Gordon Bower, manager of Product Development-Research Division, Moore Business Forms, Inc. Gordon's educated prognostications follow, almost verbatim:

"Probably the most important point (at least to us) about the 'busness forms of the future' is the fact that there will very likely be more [forms] in use. The forms will undoubtedly be more precise in size and in printing and there will be a growing trend toward standardization in all physical characteristics . . . but, there will *be* more *of them. Such standardization will probably take place gradually by application within one industry at a time. Some evidence is already present on this point if we consider bank checks, airline tickets, and oil company charge sales forms . . .*

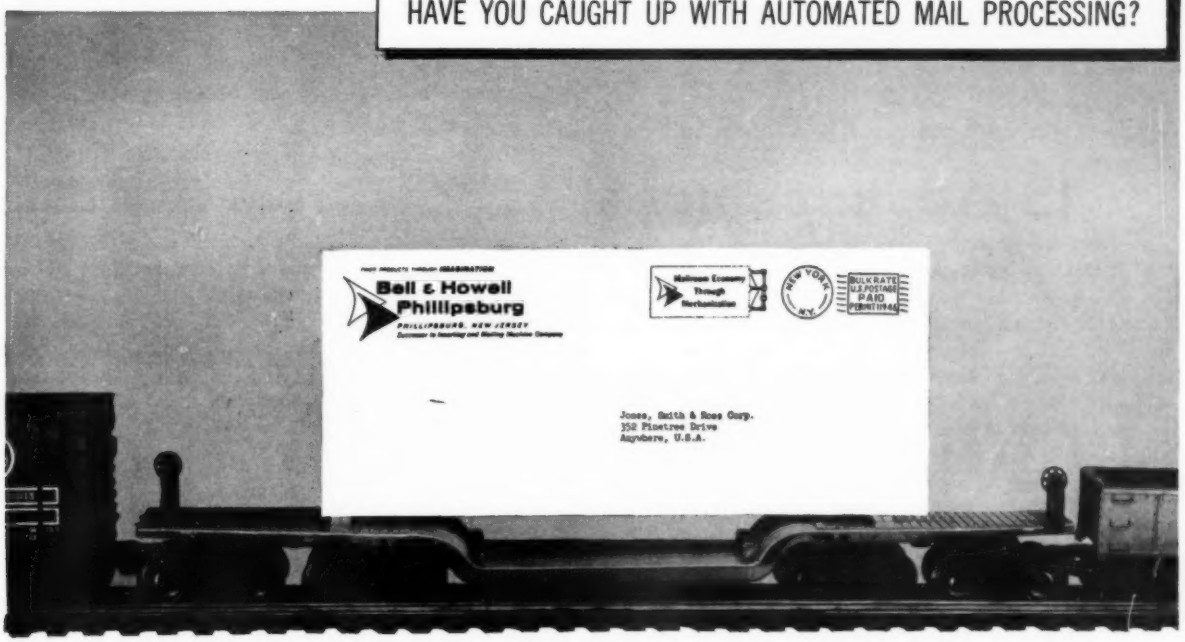
"Our statement then about there being more forms in the future is paradoxical if electronic computers and other new data processing equipment are supposed to reduce paper work. I believe the truth of this lies in the fact that the new machines and new concepts of data processing are reducing the work in paper work but not necessarily the paper. *For example, the bankers tell us that in 1952, eight billion checks were used; in 1960, thirteen billion will probably be used; and, by 1970, they predict we will use over twenty-two billion . . . and so you see, here is an industry which will spend millions of dollars for new electronic data processing equipment to reduce their paper work but they also know that they will have to handle many more forms. If the number of checks increase to this extent, deposit slips, statements and ledgers will also increase in number. It is logical to assume that this also means there will be many more purchase orders, receiving reports, saleschecks and invoice forms in use as our economy climbs upward . . .*

"Undoubtedly, new developments can be expected in the area of carbonless papers. Success thus far in the field is bound to create additional development by many of the paper and carbon suppliers. Some of these developments will probably be improved versions of carbonized record sheets while others will be papers treated to produce a carbon copy and which will not appear to be different than the ordinary papers we are using today. . . . The development effort will probably be centered on eliminating the extra sheets of carbon tissue and in improving the cleanliness and clarity of manifolded copies."

Mr. Bower also sees an increasing

(continued on page 53)

HAVE YOU CAUGHT UP WITH AUTOMATED MAIL PROCESSING?



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Dreyfack on PERSONNEL —A Monthly Feature

The Three Point Approach to Advancement

RAYMOND DREYFACK

HOW HECTIC IS YOUR JOB? Do you race around all day from one spot to the other putting out fires, checking into details, preparing special reports? Do you feverishly wire plugboards, draw up schedules, outline spec sheets for cards or forms?

In short: are you a constant bustling dynamo of energy and activity? Most data processing managers are. Either that, or darned good actors.

Let's assume for purposes of discussion that in your case the acting talent is nil, the data processing talent plentiful. And, yes, you are constantly on the move, hastily hopping from one responsibility to the next. In this case have you ever paused long enough to wonder if, in spite of all that sugar-burning activity, you're not really standing still?

Standing still on the job that is, in the advancement of your knowledge, your status, prestige and responsibility.

Think back. How much better off are you today than you were two years ago? How much more do you know? How much rosier do your future prospects seem?

If your honest answers to these questions are negative or vague, perhaps you could do with a self-inflicted shot-in-the-arm. Success, generally speaking, is a three-pronged barb. Assuming the desire and drive exists, in order to get ahead you still need: **a)** more know-how; **b)** a program of evaluation and improvement in your department, one that will bring you recognition and reward; **c)** the unloading of enough of the responsibilities currently saddling you, so that you will be allowed sufficient time for the first two achievements.

Now let's take them one by one.

Increasing know-how

Hell and a mediocre income bracket both are paved with good intentions. In citing an example, let's get basic. You're running, among ten thousand other jobs, a payroll application in your installation. You're using a calculator to extend your cards from hours to gross, then from gross to 1st net. Maybe there are four or more machine passes involved in this operation. For a number of months now—or, has it been years?—you've been *intending* to check into the possibility of a computer for the job. Volumes have grown, scheduling is tight, overtime is heavy. Instinctively you feel a computer might be the answer. You've definitely decided that the first chance you get you're going to check into this thing.

Well, brother, the *"first chance you get"* may be a long way off unless you make it your business to spur those intentions with action. For example, look at all the projects on your list at the moment. The ones requiring immediate attention, or sooner. Sure, studying that computer is important—*but*—no one's on your back to get it done.

The answer then is to get up on your own back. That's not always simple. For one thing, you're not a contortionist. Also, you can't ignore those more pressing responsibilities and still retain your comfortable, if niggardly, status as the recipient of a weekly pay check.

Yet, if you're really determined to act nothing will put you off. The biggest deterrent is the putting-off-till-tomorrow approach. Self-discipline with regard to learning is either a habit or a wild dream. Which one is up to you.

You can make it a habit by keeping a progress record in writing. Nothing fancy. Let's think in terms of a four column notebook in which you will jot down *on a daily basis* a summary of know-how added today. Column one will be narrow for date; column two will be headed *"know-how added,"* or something to that effect; the other columns we'll fill in later.

If you do this conscientiously, and make it your objective to enter something each day into the know-how column, however small, you'll be surprised at your increase of knowledge a year from now. Proportionate to this, of course, will be the increase of value to yourself, and to your employer *(or, if need be, to some other employer)*.

Evaluation and improvement

This, too, becomes a habit, and also provides the heading for Column No. 3 of your Daily Self-Advancement Schedule. Is everything perfectly smooth and fool-proof in your installation? No problems, hitches, or rough areas of processing or personnel performance? If such is the case, you're either a genius, you have a one-sorter no-tab installation, or you're kidding yourself.

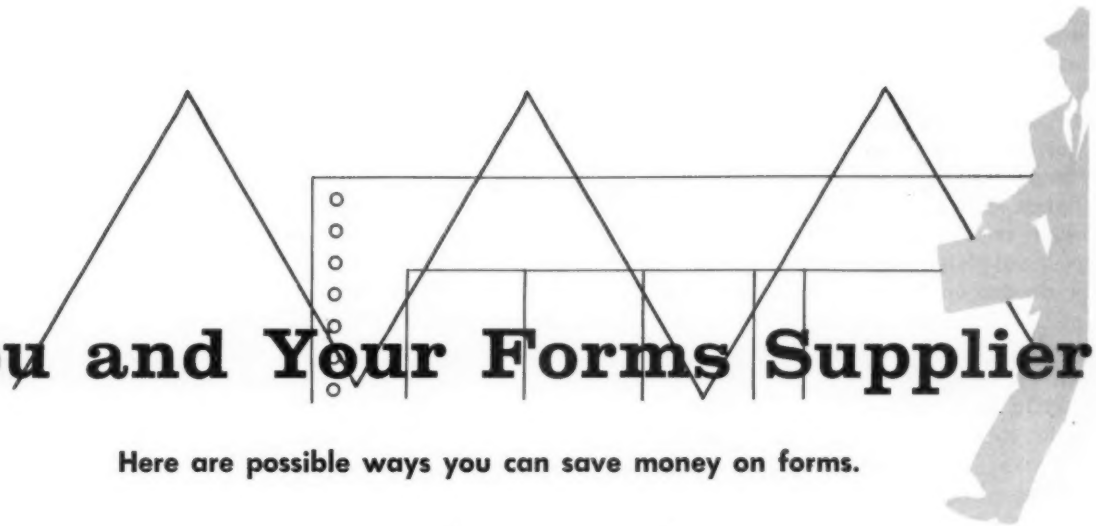
But assuming, like most of us, you have problems galore and then some, the next question is what are you doing about them? Not the fire-putting-out kind of problems, the plugboard that's back-circuiting, or the report that needs changing in a hurry. What we have in mind is the chronic problem areas. That place where more training seems indicated, or a systems change, or some control revision. That place you *intend* doing something about, but never quite got to.

Improvements Made Today. This too warrants a daily entry, *every day*. Where possible, written up in deathless prose for the boss to see and jot down on one of his mental index cards.

The back unloading process

You won't have time to increase your know-how or evaluate your in-

(continued on page 53)



You and Your Forms Supplier

Here are possible ways you can save money on forms.

PROBABLY you have at one time or another had the feeling that it would be great to discover a magic *"money-stretcher"* for operation within your departmental budget. No doubt you have had periodic company-wide cost-cutting drives. Directives are handed down to all department heads that they are to exercise maximum care in the purchase of all items, get several bids on everything, hold inventory to rock-bottom low level, etc., etc. We don't propose to offer the answer to all these problems, but we can set forth a few ways by which you may perhaps make your business forms dollar buy more business forms.

By D. C. Kerrigan

For the purposes of this article, let's confine our attention to marginally-punched continuous forms, since these are the forms most commonly used on punched card equipment and other modern data processing machines. We think, after more than twenty years in the selling end of the forms business, that a good place to begin your dollar-stretching program is with the *forms salesman* himself. Because good old Joe Salesman is a *"nice guy"* doesn't seem to be a good enough reason to buy from him these days. Either he's a professional forms salesman or he's not — and if he's not, well then the chances are ten to one that he's costing you *plenty* in missed opportunities for real savings. Assuming that he is a real *"pro,"* how consistent is he in his pricing policies? We've seen many a smart, on-his-toes forms salesman in our time, but some of them are on the constant alert for ways and means to load their forms orders with unnecessary frills — anything to get a bigger commission. We can say, therefore, that the first step is to select, of all forms salesmen who call on you, the one who best combines product knowledge with integrity. If you have a member of National Business Forms Associates calling on you, ask him to explain the NBFA Code of Ethics.

Salesman's Responsibility

Now that you've selected your number one forms supplier, sit down with him and tell him that you're going to charge him with full responsibility for inventory surveillance, economical combination

ordering, cost-cutting forms specifications, and a constant flow of ideas. He'll give you a much fuller measure of his time and talent if you treat him like the specialist he is, rather than an itinerant peddler.

Let us now take a quick look at the product itself, to determine ways by which we may hold forms costs to the minimum. To begin with, all continuous forms *(except stock forms)* are priced on the basis of *"flat charges"* and *"running charges."* The *"flat charges"* are on a per order basis and the *"running charges"* are on a per M basis. You pay a basic flat charge and a basic running charge, included in which are the ordinary features of the form: composition, plate-making, press set-up, paper, carbon, processing on the press, collating, packaging, labeling. Such features as file-punching, special perforations, numbering, back-printing, copy to copy changes, etc., usually require extra charges. Find out, in each case, what the basic specifications allow, so that you can question the need of any extra features. If we were on your side of the desk, as a matter of fact, we'd ask the forms salesman to *itemize* his price quotations in writing — not as a question of his integrity, but rather as a means of determining the relative worth of various product features. Two-color printing, for example, is a *flat* charge, and consequently it is very inexpensive on long runs — but on short runs it's sometimes an expensive luxury. Another important consideration is that special features sometimes disqualify a specific job from the most economical list. Many manufacturers have *"limited specifications lists,"* designed to afford maximum production economy through adherence to simplest product specifications, with a very considerable part of the economy thus realized being passed to the consumer.

Combination Ordering

One of the best dollar-savers of which we know is combination ordering. Generally speaking, forms of *like size* may be priced together, in which case you are only charged for one *basic flat* charge plus, of course, the pertinent charge for the plate change — but plate changes are *always* less expensive than the basic flat charge. This means that it can be very profitable for you to plan to have the fewest number of form sizes in your operation. Additional savings will be thereby effected by reducing machine down-time for changing width of forms-tractor or other pinfeed device. If you use thin-post or nylon-post binders for housing finished reports, reducing your number of forms sizes will also reduce the number of binder sizes you must inventory.

Recent improvement in the production of imprinted stock forms deserves attention. Until recently these were superimposed, often presenting an unattractive mis-match of the imprinted rules and captions with the preprinted horizontal stock form rules. Now virtually all imprinted stock forms are lithographed on blank, pre-processed paper, resulting in attractive, high-quality work. Generally speaking, this type form offers two distinct advantages: very fast delivery and economical availability in small ordering quantities. In substantial volume, of course, custom-made forms are usually less expensive. You might then ask yourself if you have certain forms in your operation which are small-volume jobs and for which you have been paying tailor-made prices. You no longer need to compromise appearance and quality when you order imprinted stock forms.

If lack of adequate storage space is causing you to order in uneconomical quantities, you should definitely investigate the possibility of placing orders on a split-shipment basis. In many instances the small extra charge for this service will be far less than you would pay for extra press set-up charges. Many of the National Business Forms Associates *(all of which are* local *business men)* are establishing local forms storage warehouses for the use of their customers, at little or no extra charge.

Paper Has Improved

Some forms users do not seem to be aware of the great improvement which has been made in the last few years in the quality of paper itself. Based on quality considerations in effect 10, 15, 20 years ago, many users set up policies with reference to the use of premium-price papers, such as rag content papers, watermarked bond stock, etc. Current reappraisal of such policies is desirable since the paper mills are turning out uniformly high-quality stock in the base price category. Thoughtless use of premium-price stock can waste a big chunk of your forms dollar!

If you have multi-copy forms which have changes from copy to copy, ask your forms salesman to explain the rules to you. Generally speaking, marginal words *(sometimes called page titles)* are included in base price of continuous forms, since they are printed from a different *unit* on the press than is used for printing the main part of the form. Plate changes, in sequence of increasing cost, are: deletions, minor plate changes, intermediate plate changes, and major plate changes. Frequently it is possible to accomplish your purpose through the use of the less expensive plate-change devices. These charges are *flat* charges, so once more it should be noted that they are much more significant on the small quantity runs than they are on the more substantial quantities.

The Collating Staple

The supplier can often furnish valuable features at a very nominal cost. For example, we've seen

countless instances where clerical personnel are laboriously *(and expensively!)* hand-punching file copies, whereas these copies could have been pre-punched by the manufacturer at little or no increase in base cost. When certain copies of multi-copy set must remain together, it's almost always cheaper to have the manufacturer glue or staple them together than it is to have your personnel do it. A rather ingenious recent development in this area is the collating staple, a means whereby the cost of section-stapling is reduced by stapling through file-holes. On the subject of fastening forms together, we feel that the use of staples can usually be justified only where the *system* requires them, and even here we should give careful thought to the use of greatly improved edge-gluing techniques. Multi-copy forms, in our experience, can be successfully fed through high-speed equipment through the use of crimping, up to five or six-part forms. Staples are, generally, still recommended for forms over six parts.

Carbon Legibility

We'd say that all too frequently the people who design and order forms are unfair to the people who must read, interpret and act upon the information machine-printed on the forms. Your business-forms salesman should be a definite help to you in getting proper *carbon legibility*. We've seen cases where the last several copies of form sets are dangerously illegible — and we've seen other cases where forms purchased as 10-part or 12-part sets are stripped down into 5-part or 6-part sets and run through the business machine twice! Manufacturers have many different carbon formulae and in recent years titanium-coated papers have offered additional legibility improvement.

In the broad general area of *product quality*, we think you should insist that your supplier avoid excessive breaks, sloppy splicing, and excessive confetti. You have a right to expect careful packaging in containers which will withstand the ravages of rough transit and ceiling-high storage. Your cartons should be cleanly and carefully labeled in a manner so that the identification won't get torn off.

In summary, then, here's what you've got a right to expect of your forms supplier: professional sales representation, price integrity, inventory surveillance, information as to cost-cutting techniques, product know-how, product quality *(including packaging and labeling)*. We think you're paying for all these things, whether or not they're being delivered to you! And we also believe that the right forms salesman can help you stretch your forms dollar a long way!

■ ■ ■

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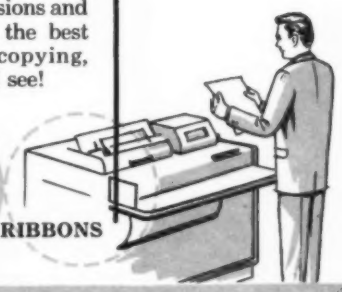

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Circle No. 2 on Reader Service Card.

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Can be attached to products, conveyor belts, bins, boxes, shelving, to implement production control, inventory control, invoicing and other punched card systems. Beemak Holders have withstood hard usage for eight years and are made in ivory, red, green, blue, yellow and black for color coding if desirable. Keeping correct tab cards at the source of record data provides better controls and faster handling of all types of merchandise.

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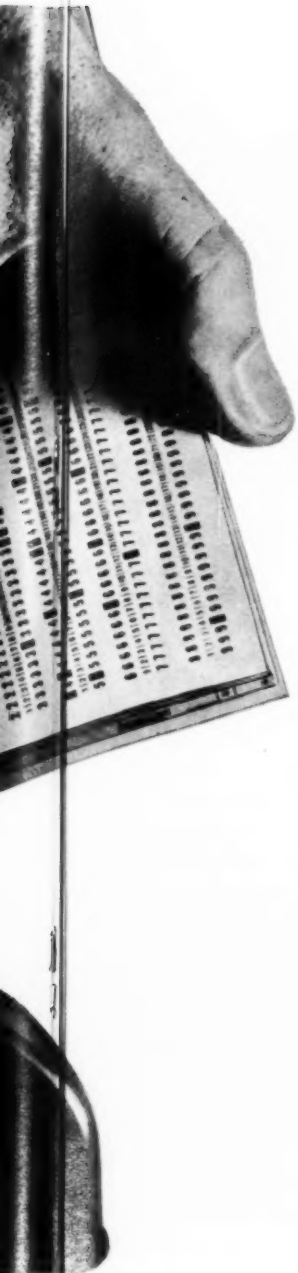
Now all you need to send IBM cards home to Central Accounting is a low-cost device smaller than a typewriter. You just call the receiving location on the telephone and insert the cards into the IBM Card Reader. Variable information can be introduced through a keyboard. At the receiving end, identical data is automatically punched on cards by the IBM Card Punch. The transmission charge is the same as for any telephone call.

*Trademark



The Card Reader and Card Punch are the sending and receiving elements of the new IBM 1001 Data Transmission System. Used in conjunction with telephone company service, such as Bell System Data-Phone, the system can transmit pre-punched cards or information keyed in by the sender. No additional punched card equipment is needed at the sending end.

This new advance in IBM TELE-PROCESSING means that a central data system, such as the IBM RAMAC® 305, will be able to update records of transactions periodically reported from many scattered locations such as centralized payroll and inventory control, cash reporting from branch offices, store-ordering of stock in supermarket chains.

WHAT IBM TELE-PROCESSING MEANS TO YOU

This system is a further extension of IBM TELE-PROCESSING—a concept backed by years of IBM experience in data transmission. It makes possible faster data flow and better management control. Ask your IBM representative about the new advances in IBM TELE-PROCESSING and how they can help your company gain peak efficiency in data processing applications. Data Processing Division, International Business Machines Corporation.

Circle No. 16 on Reader Service Card.

IBM® TELE-PROCESSING

Now... "Home on Time" is a Habit!

Carditioner in the Tab Department changes overtime to free time!

Obscurely mutilated cards kept the "flow" out of this Tab Supervisor's department. Visual sorts always skipped over some of them. Machines misread. Machines jammed. Men and equipment sat idle. Often the day's work lasted into the night.

Now, a Cummins Carditioner puts "flow" in this Tab Department. Automatically it reconditions 275 cards a minute – makes crumpled cards machineable, rejects any that are stapled, taped or have folded corners. No manual sorting, hardly any misreadings – reports balance easily. Jams drop by a whopping 75%. Punching of substitutes is all but eliminated, together with rewriting, reproducing, reverifying, refiling, rerunning, and the 6-7% errors which always occur when substitutes are punched. A single machine helps make the Tab Department a model of efficiency – good news for workers and management alike!

Send for new booklet!
See at a glance how Carditioner irons out cards, irons out the kinks in tab operations. Case histories on request.

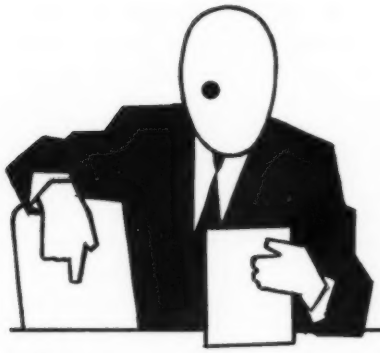
IN BUSINESS AND BANKS SINCE 1907

Cummins

Cummins-Chicago Corporation
4740 North Ravenswood Avenue, Chicago 40, Illinois
Sales and Service in all Principal Cities

Circle No. 17 on Reader Service Card.

By Roy J. Brown



The Role of the Supervisor

The responsibilities of a data processing supervisor, from a supervisor's point of view.

THERE ARE AS MANY VERSIONS of a data processing supervisor's role in business today as there are people connected with data processing, directly or indirectly. Directors, comptrollers, machine operators, forms salesmen and other trade representatives look at data processing supervisors from different viewpoints. We have read articles written by some of these, each advising and suggesting where data processing supervisors place in business society should be set. Each one of these is naturally biased by his own point of view, as this one is also. A supervisor's role, from a supervisor's point of view.

The responsibilities of this position can be briefly described under the following headings:

1. Machine layout
2. Personnel
3. Card and form design
4. Procedures
5. Applications
6. Utilization
7. Scheduling
8. Controls
9. Advisory to management.

Machine layout

The supervisor of a new installation can, before operations begin, save valuable operating time by an advantageous placement of his machines. An installation presently in operation may accomplish the same results by changing the layout. A careful analysis of the situation, a review of all procedures, and models of machines, allowing working areas at each machine, will enable the supervisor to place his machines to allow for a minimum of movement and confusion.

Kits for layout planning are available from suppliers of accessory equipment. A time and distance study on all procedures is the responsibility of the data processing supervisor.

Personnel

The acceptability, aptitudes, and training of all personnel in an installation are also the responsibility of the data processing supervisor. Although his assistants may do the actual training, a supervisor must check regularly to see that each member of his staff is increasing his value to the department. As in all other phases of operation, the supervisor must know the people who work for him and assess each one as to their personality, receptiveness, capabilities, and failures. We can never be fortunate enough to acquire a complete staff with excellent qualifications, but we can have a staff, the members of which are constantly progressing.

Teaching, understanding, fairness, and above all, the desire to help your staff increase their knowledge in the field, and thus, their benefit to the company, will reward you with an eager, interested group, requiring a minimum of supervision and follow-up. Training and short seminars within the installation, even if it requires time other than regular working hours, serve to maintain interest and incentive.

A supervisor, regardless of the field, must always remember that each one of his employees is a human being, and no two people are exactly the same. It requires effort to understand each individual, but it is time well spent.

Card and form design

Many times I have heard supervisors complain about the registration of forms, blaming the salesmen, the printers, etc., etc., when actually the supervisor just didn't take time to check the proofs when they were submitted for approval.

In designing a card for a new application, it is the supervisor's responsibility to ensure that the fields for punching follow the order of information on the source data, as closely as possible, to facilitate key punching.

It is also his responsibility to ensure that the card contains all the required information and that needless information is not included. The design of the card will also depend on the amount of manual handling and its clerical use.

The card is the direct responsibility of the data

processing supervisor, whereas the form design may be a team effort. The best possible team for forms work consists of the head of the department which will handle the completed form, the supervisor, a forms salesman, and a member of higher management. Each of these people contribute to the team effort and the result is usually a form satisfactory to all concerned.

Procedures

One of the most important functions of a supervisor is the institution and amendment of procedures and flow charts for all routine work in his department. Procedures reduce supervision time by at least fifty per cent.

If your procedures *"spell out"* in detail all of the steps necessary to complete a specific routine job, even an intermediate operator, if he follows the procedure, can successfully complete this job without supervision. A new operator, with previous experience in another installation, can learn his new tasks very quickly and easily, and can then ask intelligent questions about the operation.

A procedure book, complete with forms and cards used, should be the data processing operator's *"bible"*, and if amended regularly, enables him to perform routine tasks satisfactorily.

Flow charts of each procedure serve as a quick reference for the operator. They are a picture of the procedure, much easier for the uninitiated to understand. The flow chart, in a single page, tells the instant *"broad brush"* picture of seven or eight pages of words and conveys to management this picture of the necessary steps to complete an operation.

Many times data processing supervisors, reporting to top management, find it difficult to express their thoughts. The flow chart helps to give management the number of steps involved and becomes a visual aid to telling this story.

A good supervisor should be regularly reviewing his procedures and flow charts for the purpose of speeding up his operations. He should always be searching for a better way to do things, at a saving of time and money for his company.

Procedures unchanged over a long period of time should be a danger sign to a supervisor that all is not well, and that immediate action is necessary.

Applications

A good supervisor is constantly looking for new applications, phases of his company's operations which can be handled by punched card methods satisfactorily.

Unfortunately, many supervisors set up routines as they are instructed by their superior and are content to have their department running smoothly, afraid that some new application will upset the routine.

Each new application found should be discussed in detail with the head of the department involved. The details should be set down. Then, both of the supervisors should attempt to tear down this proposal, thus *"plugging the leaks"* as it were to have ready answers for any questions management might ask.

All proposals of new applications should be written in detail, flow charted with drafts of necessary forms and cards, and submitted to management in this form. Too often a good proposal is *"shot down"* because management people have many decisions to make and do not always have time to concentrate on a word proposal. Management can study the written proposal when time allows them and ask only the questions that may be necessary to clarify parts of the proposal.

It is important to remember that sufficient volume of data should always be present when proposing a new application. A small task should not be proposed merely to take up a bit of extra time that has accumulated. A supervisor should always try to justify his proposals by one or more of the following:

1. Reduction of costs
2. Saving of time
3. Increase in accuracy
4. Urgency in completing final report
5. Volume of data
6. Extra utilized information.

The growth of an installation, and quite probably the supervisor's pay check, can be directly associated with his contributions to his company. Every new satisfactory application increases a supervisor's contribution.

Utilization

A data processing supervisor should know exactly what percentage of utilization he is getting from his equipment. This is a necessity when planning new procedures, fitting in special jobs, requesting new equipment, analyzing costs, and to assure that his company is obtaining the best possible return from their investment.

We accomplish this through the use of job cards, which contain the following information:

Operator number, job code, date, machine code, number of cards used, department code, breakdown code, and time in minutes.

Sorting on the applicable fields, we are able to assess the actual running time of each machine daily, the time for each specific job, the time spread for each department, the utilization by machine, the breakdown time and number of cards processed.

Management people are entitled to this information. Too often a complacent supervisor feels that he can accurately *"guestimate"* the figures for utilization, or when faced with the problem of pro-

viding cost figures, spends long hours in research to arrive at the solution, which should be available at any time.

Scheduling

A smooth, easily manageable data processing department, doing a volume of work for many different departments, requires a schedule. A fairly simple, workable system for devising a schedule was printed in Volume II of *The Punched Card Annual*, under the title of *"Work Day Schedules for Monthly Closings,"* by Donald A. Barclay. A modified form of this schedule is what we are currently using, and has proven very satisfactory for our purposes.

The most important factor in scheduling is to endeavor to adhere to the schedule, if at all possible. However, there are factors, such as urgent reports, which prevent making the schedule a hard and fast rule. Juggling the schedule is the supervisor's prerogative and is frequently necessary to satisfy other departments.

The advantages of a schedule are many. A few are:

1. To check on completion of routine jobs,
2. To assign dates for new or unexpected jobs,
3. To ensure an equal flow of incoming data throughout the month,
4. To advise all departments of target dates for reports,
5. To enable operators, in conjunction with procedures, to perform routine functions with minimum of direct supervision.

Controls

Control of input and output from punched card installations is an essential part of operation.

It is useless to save three days on a machine application and waste four days attempting to balance the finished report.

A separate control station is one effective method of reducing errors. All data, input and output, flow through this station. The responsibilities of a control station demand that clerical personnel be of the highest calibre. Incoming data should be time and date stamped and in some instances recorded. If at all possible some target figure should be set for balancing purposes. A hash total perhaps, but it ensures control that incoming and outgoing data is in accord.

A control unit is responsible to the supervisor for accuracy of reports, progress of reports, distribution of reports, maintenance of schedule and other clerical functions. The supervisor will find his task much easier if he has a capable and efficient control unit supervisor.

Advisory to management

By far the most important role a good supervisor plays in industry and business today is his part on the management team. He may be a junior or senior member of that team, but definitely he should be a part of it. Companies which regard their data processing supervisor as a glorified machine operator are depriving themselves of valuable advice.

Many times some companies will institute techniques and procedures without consulting their data processing supervisors, only to find that theory and operation sometimes differ. Many data processing supervisors, with on the spot experience, are actually methods analysts, the equal of one primarily thus engaged.

The conscientious supervisor can never be idle. His position requires all the qualifications of an office manager, plus technical skill, and determination. He must be continually doing research, studying, and watching new developments in equipment and techniques. The picture is changing and data processing supervisors are becoming recognized as important members of the management team. It is a supervisor's responsibility to accept and qualify for this achievement.

■ ■ ■

Seen in Print

EXECUTIVE TRENDS: Delegation vs. assignment by Harold B. Schmidhauser, Nation's Business. July, 1960.

A management methods authority tells how delegation and assignment differ and why trouble results when the two are confused.

INSTALLING A MEDIUM-SIZED COMPUTER by L. Fred Boyce, Jr., Journal of Accountancy, July, 1960.

A case history bears out the growing belief that computer installation should be justified on the basis of management's need for prompt information, rather than on any expectation of savings in data processing.

COMMUNITY RELATIONS by Stirling Turner. Navy Management Review, June, 1960.

One of the important tasks in management of the field activity is the maintenance of good relations with the local community. The author outlines his own company's philosophy of community relations. Although the Navy activity is in a much different position from the industrial corporation, many of the principles of community relations apply to both the Government and the private organization. ■

De Paris on EQUIPMENT —A Regular Feature

Evaluating Available Equipment

JOSEPH R. DE PARIS

THE NEW COMPUTERS which are flooding the data processing market present both a challenge and an opportunity to everyone connected with data processing. The challenge is to keep informed of developments in the field and the opportunity is to harness the power of these computers for the betterment of systems, procedures, and management. In the effort to be equal to the challenge and to be ready for the opportunity, the alert data processor is engaged in studying, comparing, and evaluating the available equipment. He is re-examining his present commitments and future requirements. In short, he is determining what his course should be, viewed in the light of the implications of this new-generation of computing systems.

Studying and evaluating equipment requires careful, painstaking research designed to accomplish this specific purpose: select the computer *(if one is warranted)* best suited to the needs and budget of *your* company's data processing activities. If one keeps this objective in sight, he realizes that the study of hardware is not the end itself, but the means to the end. The end always is to determine which system will perform most effectively on your job, generating the required final results, with due consideration for cost.

Hardware vs. system

In the course of making such a determination, it is necessary, of course, to study hardware and to compare hardware packages. But it is just as necessary to avoid the tendency to overemphasize hardware while losing sight of system. It is easy to become too intrigued with the nuances of milliseconds and microseconds, off-line and on-line, card and tape, drum and core, cards per minute and characters per second, ad infinitum.

Hardware alone cannot and does not tell the story. By comparing characteristics of components, you may conclude that one component is definitely superior; yet other factors in the system may overcome the deficiency. This fact will only come to light if you consider the whole computer and the job which it is to perform.

Erroneous conceptions are possible when one isolates factors and subjects them, by themselves, to critical appraisal. Consider storage capacities as an example. One computer may have more storage positions than another. This is a fact, but it is one that may lead you up the primrose path. Looking at how the storage is utilized in each system may be more rewarding than just the raw fact that one has more storage than the other. It may well be that the one with more storage, uses more to perform its functions.

Storage

Machines with fixed word lengths, for example, require more storage for data words than do machines with variable word lengths. Why? Because the fixed word length machine wastes many positions of storage for high order zeros. Some machines use fixed length instructions; others use variable length instructions. Here again there is a difference in storage.

On the other hand, variable word length machines need to be told the position at which each field of data ends. This requires certain housekeeping or initializing routines which will consume storage space.

The logic of computers differs. There are computers which use three-address command systems, those using two-address systems, and those with single-address systems. There are other versions as well. In a single address system it will take three instructions to accomplish a simple A plus B and store the result in C. In a two or three-address system only one instruction may be required. The difference in storage positions required is obvious. Thus the command structure of a computer, the kinds of commands provided, and the power of those commands, affect the storage capacities of the computer.

Peripheral equipment

Another danger area is in peripheral equipment. Most systems offer a variety of input-output equipment for paper tape, magnetic tape, punched cards, and line printing. The rated speeds of characters per minute, cards per minute, and lines per minute, naturally are not the same from one system to another. In going about the job of comparing and evaluating, it is easy to be beguiled by the raw speeds alone. Yet these speeds by themselves are not very meaningful. They take on significance only when other related factors have been brought into focus.

For instance, how much time sharing between units is built into the system? Can an input unit operate while processing is taking place? Can processing take place while an output unit is operating? Can input-output and processing take place simultaneously, and if so, to what degree?

Except under ideal conditions, rated speeds are not likely to be attained when time-sharing is not engineered into the system. For this purpose, some machines have buffer storages between the central processor and the various peripheral units. These allow time sharing or simultaneity to a much greater ex-

tent than would be possible without a buffer. Some computers are unbuffered which means that there may be as much as 50% or more reduction from rated speeds under actual working conditions. Is this always the case? Not at all! It depends on the job being processed. The time required for the processing cycle, the frequency of input-output, and the relationship in time between the occurrences of input-output-process, all play a part in determining actual or effective speed.

(This is the first of two articles in this series. The concluding article will appear in next month's column.)

By the time you read this IBM may have announced the availability of a new, improved disk storage device for the 1401. Indications are that the access time will be less than that of the present Ramac.

A read buffer and a punch buffer now are available at extra cost on the 1401. Combined with the print buffer, these seem to buffer the 1401 pretty well!

* * *

Business Efficiency Aids, Inc. of Skokie, Ill. is now marketing magnetic punched cards which fan apart when touched by a file clerk, exposing the interpreted edge of about 20 cards. The magnetic principle employed causes the cards to repel each other at the touch of a finger. This idea could be a boon to operations where manual locating and pulling of cards is involved.

* * *

Rese Engineering, Inc., Philadelphia, Pa. is offering a magnetic tape file maintenance and data retrieval system called the Rese Findafact. The Findafact finds its use where high-speed computation is not required but where there are large reference files to be maintained. Findafact can economically perform the functions of tape searching for data retrieval or of inserting, deleting, and changing records for file maintenance. As an off-line system, Findafact can relieve a high-powered computer from the expensive task of searching or interrogating tapes for the purpose of inserting or extracting data.

■ ■ ■

OUR 20 CARLOADS OF PAPER CAN HELP YOU DO A BETTER JOB IN THE TAB ROOM

HERE'S HOW

Having the *right* paper for your data processing forms is basic for trouble-free tab room operation. And when you order GC Forms, you can choose exactly the paper required.

We keep *20 carloads of paper* on hand at all times, specially-made forms paper which gives you maximum smoothness, legibility, printability, opacity and resistance to tear.

First, what *variety* of paper do you need? Choose from bond, ledger, index, safety, multicopy masters, or NCR. Bond is most universally used, but your application might warrant *ledger* which is ideal for accounting pages, *index* for requisition blanks, *safety* for checks, or *multicopy masters* for reproducing many copies of orders. And, of course, when you omit carbons from your forms—*NCR!*

Second, *what weight?* Before you decide, we'll ask you: On what equipment will forms be used? Number of copies? Method of handling? How filed? Pen or pencil writing? For internal or external use, or both? Your answers to these questions help our forms design specialists decide which form paper will be right *and* most economical for you.

Third, what *color?* In our 20 carloads we have paper in white and seven colors. Pick the color you like or set up an easy color-coding plan for distributing forms copies.

Would you like some samples of GC Data Processing Forms printed on different types of paper? Drop us a line at the address below and we'll be happy to send them to you immediately.

Circle No. 6 on Reader Service Card.

DATA PROCESSING FORMS

Manufactured by:
CLARKSON PRESS INC.
189 Van Rensselaer St., Buffalo 10, N.Y.
A Subsidiary of
GRAPHIC CONTROLS CORPORATION

COMPARE ADDRESSING COSTS

and you'll select the Model 10 Scriptomatic Addressing Machine!

SAVINGS PLUS *Flexibility...*

Combination of addressing equipment and punch card procedures without sacrifices or compromises.

Card master that can contain record of the individual . . . that can be updated with additional information . . . that prints *directly* to a wide variety of mailing pieces.

Card master from which a hand impression can be taken at the files.

Mechanized statistical audit directly from punched card masters . . . automatic in-filing and extraction.

Minimum file space (120 to the inch!)

Selectively print and/or skip without rearranging master file.

COST OF NEAREST COMPETING EQUIPMENT VERSUS SCRIPTOMATIC MODEL 10

MACHINE X	$1,722	NEW MODEL 10	$1,990
Feeder	800	Feeder	690
Embossing Unit	1,630	Master Card Writer	670
(Typical Case History) 21,000 Plates* embossed and assembled	1,690	(Typical Case History) 21,000 Master Cards,* typed, including transfer paper, etc.	362
Required Filing Equipment	339	Required Filing Equipment	53
Total Cost	$6,181	Total Cost	$3,765

**Every installation has specific requirements. Use this typical comparison as a guide for determining your relative costs. The more masters you require the greater the gap of cost comparison between Scriptomatic Card Masters and other address plates or stencils.*

THE MORE YOU GROW THE MORE YOU SAVE . . . WITH SCRIPTOMATIC MODEL 10

Designed to bring Scriptomatic list handling advantages within reach of small list users, the new Model 10 actually saves you more as your operations and your mailing lists grow. For example, costs for handling a list of 50,000 names with Machine X would be $9,102.00, as compared to Scriptomatic cost of $4,338.00. For 100,000 names, compare Machine X at $14,052.00 with the Scriptomatic Model 10 at $5,325.00!

WRITE FOR BULLETIN "ADVANCED APPROACH TO ADDRESSING AND DATA WRITING" TODAY.

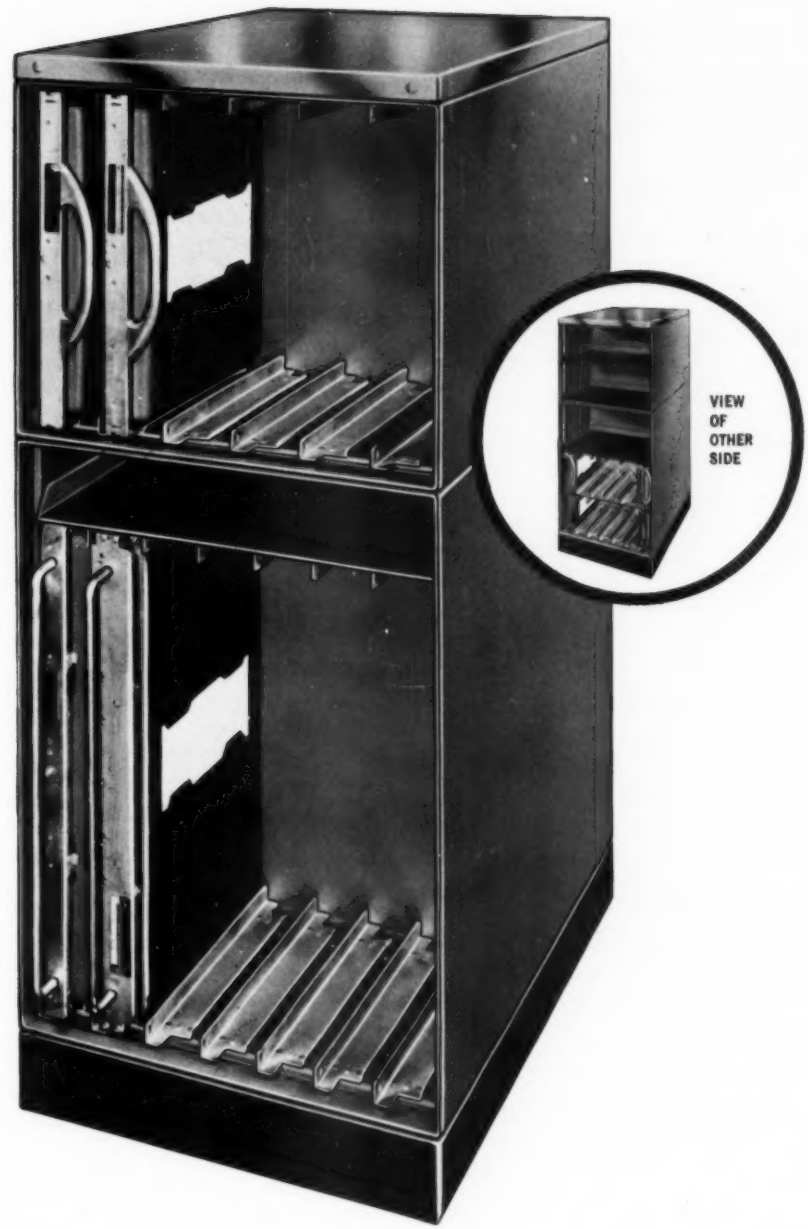
Circle No. 8 on Reader Service Card.

Scriptomatic Prints from Typewritten Cards—Double the Flexibility—Half the Cost!

Scriptomatic

Modern Addressing—Data Writing Machines and Methods

SCRIPTOMATIC, INC. • 1109 Vine Street • Philadelphia 7, Pa.



This is the new Diebold Modular Control Panel system. Shown here is but one of an almost unlimited variety of interior arrangements possible. In addition, you have a choice of three different cabinet sizes, drawer units, casters or stationary bases. And all these arrangements can be changed when an as your requirements change. The coupon will bring details without obligation.

DIEBOLD

INCORPORATED

Circle No. 18 on Reader Service Card.

DIEBOLD, Incorporated Dept. OE-187
CANTON 2, OHIO

Gentlemen: Please send complete information on Diebold Control Panel Storage.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

DIO-1287

OUTPUTS ITEMS OF INTEREST FROM HERE AND THERE

COMPUTER FILM

Fortune magazine has available for loan their new film, *The Computer Comes to Marketing*, which conveys the message that marketing men and computer experts are beginning to speak each other's language. There will be a tremendous surge of interest in computers for applications having to do with the *"new frontier of computer use,"* by which *Fortune* means all those areas covered by distribution, marketing, and advertising.

This conclusion, and the facts in the film, are based upon editorial material from *Fortune* magazine, plus additional research into the subject of computer use in marketing operations among a broad cross-section of American companies, ranging from the largest to fairly small companies.

The film is available on free loan through Robert Hattersley, Fortune Films, Time & Life Building, Rockefeller Center, New York 20, N. Y. The telephone number is JUdson 6-1212.

RCA OPENS PHILADELPHIA OFFICE

RCA Electronic Data Processing Division has opened new branch and district offices at 2 Penn Center, Philadelphia, to provide sales and service for computer system customers in Eastern Pennsylvania, Southern New Jersey and Delaware. The offices formerly were located in Camden, N. J.

STANDARD REGISTER/FINLAND

The Standard Register Company added its seventh foreign associate plant when contracts were signed recently with Oy Herman Lindell Ab, Helsinki, Finland, one of the oldest and largest printing and office equipment companies in Finland with over 400 employees.

The well-established company joins R. L. Crain Limited, Ottawa, Canada; W. H. Smith & Son (*Alacra*) Ltd., London, England; Sten Dahlander, Stockholm, Sweden; Impresora Ariel, S. A., Havana, Cuba; Gemah Formas Continuas, Caracas, Venezuela; and Carvajal & Cia., Ltda., Cali, Colombia, as associates of Standard Register.

NEW NAME FOR CARTERET

Carteret Business Forms, Incorporated was chosen as being synonymous with the company's full operation—an advanced range of business forms and systems: snapout and other unit sets; continuous, with and without carbon; tabulating; register forms and machines; manifolding specialties; visible and punched devices for special procedures; and a complete line of data processing accessories. The firm was formerly known as Carteret Printing Company, Inc.

DACOM OPENS BUFFALO HEADQUARTERS

The Dacom Corporation, a professional computing service for engineering, research and industry, has been established in Buffalo, N.Y. by William H. Mestler, president of the new firm.

This new company, according to Mestler, is in a position to discuss problems lying within the fields of both business data processing and scientific-engineering, research calculations. Solutions to these problems in varied fields are made through the use of large scale computing equipment manned by professional computing experts. Dacom has available to it the complete staff of M.I.T. for support research if needed, according to Mestler.

DATA PROCESSING CENTER

Plans for the construction of a two-story communication and data processing center in northeast Cedar Rapids were announced by Collins Radio Company.

When completed the center will house a fully operational system of Collins single sideband and microwave communication equipment and a centralized computing system. The center is expected to be in the first phase of operational use by March 1, 1961.

The centralized computing system will be used directly by all of the divisions of Collins throughout the United States and Canada. When the computing section is fully operational, information will be sent into a giant IBM 7070 computer by an extensive company data link system called Kineplex, which is an exclusive electronic data processing system developed by Collins Western Division.

Collins divisions will be able to have their inventory, shipping, receiving, production and payroll records and other information necessary for daily operations sent by wire into the central computing system, and the data will be fed back to the individual branches from the Cedar Rapids center.

IMA CENTER

In July, 40 executives gathered at Sao Paulo, Brazil, for the opening session of the first *"overseas"* Management Center of the International Management Association, affiliate of the American Management Association.

The Center opened with a two-day orientation seminar on profit planning and preservation in an inflationary period. Chairman of the meeting was Howard Dutemple, superintendente, Ultralar, Ltda. Presentations, given simultaneously in English and Portuguese, covered the following topics: the effectiveness of profit planning, constructing the profit plan, the use of budgets for capital expenditures, and the control of inventories.

The opening of the Center climaxes a four-year period of study and research by the International Management Association. IMA was founded in 1956 to explore ways of making available to overseas executives programs based on the AMA concept of the exchange of information and experience among operating managers. Until now, the AMA program has been restricted to the United States and Canada.

The Sao Paulo Center was made possible by a joint fund contributed by the Richardson Foundation of the Vick Chemical Company and the American Management Association. When the Center becomes self-supporting it will repay the initial in-

(Continued on next page)

vestment and the fund will be used to establish another Center in another part of the world.

G-15 TO JAPAN

A precision-minded weather forecaster has been *"hired"* by Japan Air Lines to boost efficiency in their aircraft operations.

The forecaster—a Bendix G-15 data processing system—will soon be installed for use by the air lines' Meteorological Division to keep track of up-to-the-minute weather and operations data. The computer's chief job will be that of figuring optimum flight plans quickly and accurately by making maximum use of speed, time, wind, fuel flow, temperature, load, and cost information.

The G-15 is presently doing similar work for United Air Lines and American Airlines.

FIRM APPLIES ELECTRONIC TECHNIQUES

Formation of A. T. Parker and Associates, Hollywood, Calif., makes available application of electronic principles and devices in the solution of problems in non-electronic businesses.

The service offers practical techniques by which creative imagination in the electronics field can be productively utilized in such diverse areas as mining, oil well drilling, grain storage, water supply systems, advertising, machine operation and control, construction work, manufacturing, transportation services, architecture, and many more.

The work is accomplished by creative and practical electronic engineers who specialize in applying the principles of electronic communications, telemetering, automatic control and other electronic fields to businesses of all kinds.

GE AND ASU

The General Electric Company's Computer Department installed a million-dollar data processing system at the Computer Center of Arizona State University at nearby Tempe. The new, transistorized system will replace competitive equipment installed by General Electric in 1957 when the Computer Center was established jointly by the University and the Computer Department.

The new computer system, known as the 304, is designed and manufactured by General Electric in Phoenix to specifications of National Cash Register Company.

RCA DATA PROCESSING REALIGNED

Announcement of the establishment of three integrated departments—Commercial Systems, Data Communications and Custom Projects, and Industrial Computer Systems—was made by Donald H. Kunsman, vice president and general manager of the Electronic Data Processing Division.

"With more than 100 systems either installed or on order and new orders being received every day, it became apparent that our organization had to be broadened and departmentalized in order to make the most of our opportunities and best serve

(continued on next page)

KEE LOX

FINE INKED RIBBONS . . .

FOR ALL OFFICE MACHINES AND DATA PROCESSING EQUIPMENT

it's the **INK** *that makes the difference . . .*

a difference that means more impressions per ribbon—and more impressions per dollar.

AVAILABLE WITH OFFSET DUPLICATING FORMULAS AT NO EXTRA COST

"Over Sixty Years of Good Impressions"

KEE LOX MANUFACTURING COMPANY
CARBON PAPERS AND INKED RIBBONS
ROCHESTER 1, NEW YORK

Sold through KEE LOX branches and selected independent stationers

Circle No. 5 on Reader Service Card.

our customers," Mr. Kunsman said. *"Developments in data communications and other peripheral gear have further stimulated our progress."*

EPSCO PRICE REDUCTION

Epsco Components, a division of Epsco, Inc., announced reduction in the price of all its encapsulated transistor digital circuit modules. The level of operations and improved assembly methods in the Components Division have made possible price reductions of from 5% to 30% depending on the type of circuit.

TDC modules are used extensively in (*making*) special-purpose computers and digital systems in the areas of data processing, data control, automation and machine control. Modules are available in various circuit groupings—flip-flops, gates, NOR circuits, amplifiers, drive and readout circuits, and pulse and signal generators.

Epsco is now marketing encapsulated flip-flop circuits from $25 up and transistor logic circuits from $14 up. These items are available for immediate delivery from stock.

BANKING SYSTEM

One of the most advanced electronic systems to be used in any bank in the United States will be installed at Mellon National Bank and Trust Company, Pittsburgh. The system will include a powerful IBM 7070 transistorized computer, which can add or subtract 16,600 five-digit numbers a second. The system will have a number of input and output tape units, each of which can read or write information magnetically at rates up to 62,500 characters per second.

Also included in the new Mellon installation will be a full complement of magnetic character sensing equipment to give the bank completely integrated data processing facilities. The 7070 will be supported by several IBM 1401 computer systems, and high-speed printers. In addition, IBM 1210 reader-sorters are included in the contract to handle check processing functions using MICR techniques. By reading magnetic ink numbers, the reader-sorter makes possible the direct input of data from checks and deposit tickets to the data processing system. With the information received from the reader-sorter, the 1401s and the 7070 will handle all check processing and checking account bookkeeping.

Deliveries of the new equipment will start late in 1961. ■

New Equipment

A *"conversation"* between the sending and receiving units of the IBM 1001 Data Transmission System takes place over existing telephone lines.

When sending station operator has dialed central office, she inserts punched card *(top left)* containing fixed numerical data into card carriage of transmitting terminal. Carriage is then moved to left *(top right)* and released on an audible signal. It then returns to its right-hand position, reading and transmitting data from the card at the rate of approximately twelve columns a second. Variable numerical information may be entered manually from keyboard *(bottom left)*. Transmitted data is received at central station, where a modified IBM card punch *(lower right)* simultaneously punches data into cards ready for machine processing.

Data Transmission System

THE IBM 1001 DATA TRANSMISSION SYSTEM offers organizations with one or more locations an economical means for sending information in machine language to a central processing point over local or long distance telephone lines.

Used in conjunction with telephone company service, such as Bell System Data-Phone, the 1001 system transmits both fixed data from prepunched cards and variable data manually entered on a keyboard. The data is received at the central point in the form of punched cards which can be fed directly into a data processing system for automatic handling of payroll, inventory control, billing or other accounting operations on a centralized basis.

The 1001 system is well suited to the transmission of data for a wide range of applications in many fields because of its low cost and ease of operation. The multiple locations of an organization from which information can be transmitted by the 1001 may be many field offices across the country or a few departments lo-

cated in different areas of a single building. By instantaneously producing punched cards with the data from such locations, the system enables the central processing point to use source data originating in the multiple locations as fast as it can be transmitted. In this way, the 1001 especially complements the in-line data processing abilities of IBM RAMAC installations, since central records can be updated by the computer as soon as supplemental transaction data is reported from any of the various locations via the data transmission system.

Basically, the 1001 is a combination of one or more IBM 1001 data transmission terminals at sending stations and a modified IBM 24 or 26 card punch at a central receiving station, with telephone-company equipment and lines.

Operation at the transmittal stations

At each sending station in a 1001 system, a compact (4⅞" high x 8" wide x 18½" long) 1001 terminal which includes a simple card reader and combined keyboard is used for the automatic transmission of numeric data read from cards and/or manually entered on the keyboard by an operator. In addition to ten keys for entering variable information, the keyboard also contains five keys for remote control of the card punch at the central location by the operator at the sending station. A speaker in the terminal provides various audible signals between this unit and the card punch for operator guidance.

In preparing for transmission from a 1001 terminal, prepunched cards—each containing fixed numerical data representing items to be reported—are pulled from a master file. The operator at the sending station establishes a direct connection with the card punch at the receiving station by conventional dialing on a modified telephone. This is a standard telephone with a switch located under the handset which enables the operator to set the station for either data transmission or normal voice communication with the receiving station.

The master cards are inserted, one at a time, in the card carriage of the terminal. The operator moves the carriage to the left until it strikes a stop, at which time it is released. As the carriage returns to its right-hand position, data from the card is read and transmitted at approximately twelve digits per second. Variable information, such as quantities or prices, can be manually keyed-in along with each card.

The system will read and transmit a maximum of twenty-two consecutive digits of numerical information from any single card. After the operator has inserted a card in the card carriage and released the carriage to return to its right-hand position, twenty-two columns of the card are read serially. To permit the most advantageous use of the 1001, this means that numeric card columns of fixed data to be transmitted should be located at the extreme left of the master card in columns one to twenty-two.

The remaining card columns in the master card may contain prepunched and interpreted alphabetic descriptive data. Although this information is not transmitted, it provides easy visual use of the master cards at the sending station. The terminal can be specified for reading from standard eighty-column cards or from fifty-one or twenty-two column cards.

At the central receiving station

Here, the signals received from a 1001 terminal are converted into punched card code and fed into an IBM card punch. Either an IBM 24 nonprinting or 26 printing punch can be used in the 1001 system, depending on whether or not printed output cards are wanted. The punch automatically records both the prepunched and manually keyed data into cards which are immediately ready for entry into an IBM accounting machine or computer. A maximum of seventy-nine columns of information can be punched into one output card at the receiving station. Automatic checking features provided in the 1001 system to ensure the accuracy of each operation include several features which check the validity of the information as it is received by the card punch. If there is any error, these signal both stations.

More than one card punch may be installed at the receiving station if a high volume of cards is to be received in a short period. If there are several punches at the central station, the terminals can be connected automatically to any available punch. A punch can be used for regular manual card punching at any time it is not in use as a receiving station for the system.

A standard feature of the receiving card punch eliminates the necessity for operator intervention at the central location. When the operator of the remote 1001 terminal dials the number of the output punch, the latter will *"answer"* and establish the connection without operator attention.

Telephone Company equipment

Besides the equipment and the telephones and telephone lines used in the 1001 Data Transmission System, modulating and demodulating subsets available from the local telephone company are also required. The modulating subset, installed at the sending station, converts the punched card code impulses generated by the transmission terminal into the audio frequencies used in the telephone circuits and lines. The demodulating subset is located at the central receiving station to convert the audio frequencies back into the impulses used for card punching.

Applications

Here are some of the many applications for which the 1001 Data Transmission System offers an easy, low-cost method of transmitting data:

Centralized payroll—With this system, various company locations throughout the country can send payroll information at any time, day or night, to payroll headquarters. Punched cards containing current payroll information (*such as man number, department, and hours worked*) are immediately available for processing.

Public utility cash reporting—Using the system, a sending station at each branch office can immediately transmit customer payment information to the central billing office, using prepunched bill stubs. Result: the time lag between a customer's payment at the branch office and the credit to his account at billing headquarters can be reduced by as much as two days, minimizing the

preparation of delinquent bills for customers who have paid.

Hospital charge reporting—With a 1001 system, hospitals can include most last-minute charges in the patient's bill at the time he is discharged. Sending stations equipped with transmission terminals located throughout the hospital permit charges to reach the billing center as soon as they occur. By reducing late billing, the system also reduces extra billing costs, collection difficulties, and the possibility of bad-debt losses.

Store ordering of frozen foods—For chain grocers, the system permits more timely and accurate store ordering and reduced store inventories. Each store with a terminal maintains a master file of cards prepunched with the numerical code for each frozen food item stocked. Orders are made up by pulling cards on the items needed, separating those with a quantity of one, and feeding these into the card reader of the 1001 for transmission to the warehouse. Multiple quantity items can be entered either by keying the quantity manually and inserting the item card or by manually keying both quantity and item code. Each store transmission terminal may also be used for connection to dairy, bakery, produce and other suppliers which have a receiving card punch station.

Library circulation control—The 1001 system provides a low-cost method for transmitting circulation charge and discharge data from decentralized libraries and those having branches to a centralized control center. Book cards and borrower cards in the form of twenty-two column punched cards are the master file. A book is charged out by inserting into the terminal the borrower card followed by the book card, with a due date either duplicated or keyed in. Data from both cards is punched into an eighty-column card at the remote central processing station. Returned books are discharged at off-peak hours by insertion of the book card alone into the sending station, causing a card to be punched at the central receiving station. This card is automatically matched with the previously punched charge card, and a fine notice prepared on any delinquent book either manually or by machine if the volume of fines is large enough. In library circulation control, the 1001 can charge four books per minute or discharge eight books a minute, offering unlimited keying, coding and other functions valuable for statistical purposes.

Prices

Sending Station	Monthly Rental	Purchase
IBM 1001 Data Transmission Terminal	$ 15.00	$ 575.00
Receiving Station		
IBM 24 Card Punch (non-printing)		
Model 3 (alphabetic and numeric)	$ 95.00	$4,050.00
Model 4 (numeric)	$ 90.00	$3,850.00
IBM 26 Printing Card Punch		
Model 3 (alphabetic and numeric)	$115.00	$5,300.00
Model 4 (numeric)	$110.00	$5,100.00

(All prices are exclusive of tax.)

Circle No. 30 on Reader Service Card.

Document Writing System

With the IBM 870 document writing system, as many as two typewritten documents, two punched cards and one punched telegraphic, five-channel paper tape can be created simultaneously. The information can be entered manually via a keyboard or automatically sensed by a punched card-reading or telegraphic tape-reading mechanism.

The 870 is especially applicable to companies having multiple distribution points and centralized data processing installations. While orders, bills, requisitions, checks, labels and the like are being written by the system on the branch level, the same data is simultaneously recorded on punched cards or paper tape. The cards or tape (*or both*) can then be sent by companion transmission equipment to the home office data processing center.

Typical applications

Some typical applications effectively performed by the 870 docu-

(continued on next page)

This document writing system speaks in three languages—typewritten script, punched cards, and punched paper tape. In the system shown here, data is recorded in the form of punched cards and typewritten copy simultaneously. A paper tape punch can also be included to yield a third form of simultaneous output.

The 870 system shown here includes *(from top to bottom)* an auxiliary card punch; an auxiliary keyboard; the control unit—with keyboard, card punching and reading station, and tape reader; and two electric typewriters. The system is controlled by a wired panel *(held by engineer)*.

ment writing system are:

Order writing
Railroad yard accounting
Inventory, property, personnel records
Automatic letter writing, directory listings
Label writing
Bill of material preparation
Insurance policy writing
Check and reconciliation card preparation
Purchase order writing
Shipping document creation
Five-channel paper tape to card conversion
Card to five-channel paper tape conversion.

The basic unit of the system is the 834 or 836 control unit, with or without five-channel paper tape reader. Data from the input tape, cards, or keyboard can be directed to any of the output units. In addition to its control function by means of a wired panel, the 834/836 can perform key punch operations and provides for the connection of various input and output devices.

Both the 834 and 836 have a card reading and card punching station and are equipped with a combination alphabetic-numeric keyboard. An auxiliary drum, as a source of constant data, can also be included. The 836 has a print unit.

Input-output units

Optional input and output units for the document writing system include the following:

972 auxiliary keyboard—Permits manual pre-keying of fixed and/or variable numeric data while the machine is performing other functions.

866 non-transmitting typewriters (1 or 2)—Permit typewriter output from any input source.

962 five-channel paper tape punch—Permits punching of numeric, alphabetic and special characters, as well as functional codes.

534 card punch (auxiliary) *or 536 printing card punch* (auxiliary)—Permits punching of detail output cards under program control. These cards may differ in content from those punched by the control unit.

One person can operate the maximum, which consists of a control unit with tape reader, an additional card punch, two typewriters, one auxiliary keyboard and a paper tape punch. Highly flexible and versatile, the system can be programmed in several modes: card-operated typewriter; card punch keyboard or auxiliary keyboard-operated typewriter; keypunch; paper tape-to-card converter; card-to-paper tape converter; paper-tape operated typewriter; keyboard-operated tape punch.

Operation is serial in nature, with one sensed or keyed character (*digit, letter or special character*) at a time being directed to a common channel through which it activates any output unit that is programmed ON. Special characters are generally pluggable.

The system operating speeds range from 20 to 9 card columns a second, depending upon the particular configuration in operation.

Monthly rentals range from $145 to $450. Purchase prices start at $6300 for a minimum system (*control unit and typewriter*).

Circle No. 31 on Reader Service Card

1401 Increments

Quadrupled magnetic core storage capacity for the solid-state IBM 1401 data processing system has been introduced by International Business Machines Corporation's Data Processing Division. By addition of the new IBM 1406 core storage unit, a total of up to 16,000 positions are now available for various card and tape configurations of the versatile system. The previous maximum core memory capacity of the 1401 for storing data and operating instructions was 4,000 positions.

With the system's new ability to accommodate increased volumes of stored data, the need for multiple passes of data is also greatly reduced. Since the 1401 employs variable length data and program instruction words to achieve maximum utilization of the magnetic core storage, its new 16,000-character memory is the equivalent of substantially larger memories in data processing systems which employ fixed record length data or instructions.

Core storage capacities of 1,400, 2,000, 4,000, 8,000, 12,000, and 16,000 positions may be obtained with either card or tape 1401 systems to handle the varying memory requirements of a wide range of data processing jobs. This greater choice of storage capacity further extends the flexibility of the 1401 and provides for greater expansion and more configurations to fit the needs of individual users.

The new IBM 1406 core storage unit is available in three models—Model 1 with a capacity of 4,000 characters, Model 2 with an 8,000-character capacity, and Model 3 with a 12,000-character capacity. Each of these three models is designed for coupling with the 1401 processing units containing 4,000 positions of core storage. This makes possible twelve combinations of new units to provide total core memories of 8,000, 12,000, or 16,000 characters for each of the four major varieties of 1401 systems *(the Models A and B card systems and Models C and D tape systems)*. The original models of the 1401 processing unit feature 1,400, 2,000, or 4,000 core storage positions.

Model 1 of the 1406 core storage unit will be available optionally during the second quarter of 1961 and Models 2 and 3 in the late third quarter of 1961. Prices *(tax exclusive)* for the expanded core storage, including both the 1406 core storage unit and necessary modifications to the 1401 processing unit, are

	Monthly Rental	Purchase
4,000 additional positions	$ 625	$22,350
8,000 additional positions	$1,150	$40,600
12,000 additional positions	$1,650	$58,100

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HOME STUDY COURSES

IBM 1401 Data Processing System

Training on the job or at home. Inform yourself and your staff with a study course for people without technical training or experience. No advanced mathematics required.

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PEOPLE AND PLACES

BURROUGHS APPOINTS

Burroughs Corporation has announced appointment of five men to top sales, service and technical positions in its new marketing division.

JACK R. KING has been appointed sales manager and RAYMOND T. SIFFERMANN, service manager of the General Products and Systems Group.

Named to key posts in the Data Processing Systems Group were V. JAMES FORD, sales manager, LLOYD BUCHANAN, field engineering manager and DR. EDGAR L. EICHHORN, professional services manager.

The appointments are in conjunction with the recent reorganization of Burroughs' marketing structure. In their new positions, the executives will provide staff support for Burroughs' marketing operations in the U. S. and Canada.

King, previously commercial sales manager for Burroughs Division, joined the company in 1937. Before moving to the firm's home office in 1958, he managed the Terre Haute, Indiana branch office for five years.

Siffermann has been associated with Burroughs for 24 years. Prior to his present appointment, he held positions in Detroit, Milwaukee, Boston, and Park Ridge, New Jersey, and most recently served as Burroughs Division's northeast regional service manager.

Ford's previous position was director of marketing planning. Associated with Burroughs since 1946, he has filled a number of other executive positions for the company.

Buchanan has had many years experience in field engineering, his most recent post being regional engineering service manager in Burroughs' Region III, which includes most midwestern and western states.

Eichhorn, who was born and educated in The Netherlands, holds a Ph.D. degree in chemistry and a D.Sc. in chemical physics from the University of Amsterdam. Engaged in data processing work for more than 11 years, he previously was manager of applied mathematics for ElectroData Division.

AT RCA

Appointment of SIGMUND SCHOTZ, formerly assistant to the president of the RCA Service Company, as Administrator of Staff Programs for the Electronic Data Processing Division, Radio Corporation of America, was announced. A native of Zloczow, Poland and a graduate of the University of Lwow, where he obtained his law degree, Mr. Schotz came to this country in 1937.

CHARLES M. (*Buck*) LEWIS, appointed Manager of the Industrial Computer Systems Department of the EDP Division of the Radio Corporation of America, has been with RCA since 1934 when he joined the company in Camden, N.J. as a broadcast transmitter engineer. In his new responsibility he heads an operation in Natick, Mass., which embraces engineering, production and marketing of industrial computer products and systems.

WALDEMAR SAEGER, an engineering specialist in the computer field, has been named Manager, Equipment Design, for the RCA 601 data processing system. A member of the Institute of Radio Engineers and Franklin Institute, Mr. Saeger holds patents involving the recording of data on magnetic tape, data handling equipment and a signal detecting circuit. He is a native of Rochester, N. Y. and was graduated from Valparaiso University in 1951 with a BS degree in electrical engineering.

DIRECTOR OF ENGINEERING

SALVATORE J. INTAGLIATA has been appointed Director of Engineering for Systematics, a Division of General Transistor Corporation.

For the past twelve years, Intagliata has been with the Underwood Corporation, General Research Laboratory of Hartford, (*Conn.*) where he was in charge of technical specifications, design, and progress on a new product line consisting of integrated data processing equipment. He holds a B.S. degree in Electrical Engineering from the Worcester Polytechnic Institute and has taken post-graduate study at the University of Connecticut. He holds a patent issued on the design of feedback controls in an electric typewriter and has three patents pending on electro-mechanical system design and automatic typewriter function.

Intagliata is a registered Professional Engineer, member of the Institute of Radio Engineers, Professional Group on Computers, Professional Group on Engineering Management and the Professional Group on Production Techniques.

PHILCO REPORTS

Expanding work in Philco's ground-space communications, mis-

silery, radar and underwater warfare will be streamlined and more completely integrated within the Communications & Weapons System Division by the following new organizational appointments:

COL. W. W. BAILEY (*USAF, Ret.*), formerly director of plans, is appointed to the position of Assistant General Manager. He will directly supervise all operations of the Communications & Weapons System Division.

GEORGE MASURAT, formerly manager of manufacturing-electronics assembly, is appointed Manager of Manufacturing. In this position Mr. Masurat will have complete charge of all manufacturing operations of the division.

The division planning function, formerly at a staff level, is now transferred to marketing and will be the responsibility of Marketing Vice President, J. M. HERTZBERG.

CHARLES R. BURKE, new regional sales manager, will be in charge of Philco's midwestern Computer Division. The Chicago office will serve a 15-state area. Mr. Burke comes to Chicago from Kansas City, Missouri, with ten years experience in electronic data processing system operation and sales. Prior to joining Philco, he was engaged in the use of large computers in the missile industry on the west coast as head of computing at the Rocketdyne Division.

JOSEPH ROBERT LEWIS has been appointed director of engineering for the Sierra Electronic Division of Philco. A veteran of 14 years service with Philco, Mr. Lewis will take charge of all engineering and design activities at the Menlo Park, California offices. He attended Dickinson College and received his engineering degree from the University of Pittsburgh. He is a member of the Institute of Radio Engineers.

BENDIX PROMOTES THREE

The Computer Division of The Bendix Corporation announced that ROBERT A. SWEET, former Eastern regional manager, has been appointed to the new position of sales manager. Sweet, headquartered in Washington, D.C. since 1956, will move to the division's home office in Los Angeles.

The Eastern regional office will be moved to New York City and will be under the supervision of ROBERT FOPEANO, former New York district manager.

CARY ARMSTRONG, senior sales engineer in the Eastern region since 1957, has been named new Washington district manager.

AT STANDARD REGISTER

KENNETH D. HAINES has been appointed director of systems and procedures. He had been acting director since January. He was formerly supervisor, systems and procedures division.

THOMAS P. KANES was named Spokane district manager. Mr. Kanes attended San Francisco State College and received a BS in Business Administration from St. Mary's College.

WILLIAM J. BABCOCK, Jr. is the new special representative in the Market Development Department. He is a graduate of the University of California with a BS in Business Administration. He joined Standard Register in 1957 as business analyst, then became a sales representative and later Pacific Northern Division supervisor.

ROBERT A. SMITH is the new Field Training Supervisor in the Sales Training Department. He is a graduate of the University of Dayton with a BS in Business Administration. He was a systems analyst, special account representative and in 1959 became Central Division supervisor.

AVERY MARKETING DIRECTOR

Reorganization of marketing activity at Avery Label Company, Monrovia, Calif., was marked by the appointment of RICHARD J. PEARSON as Director of Marketing.

Under the new organization, three Avery men will have new titles and report to Pearson. They are M. A. CONTRERAS, Field Sales Manager; R. W. MORRIS, Market Development Manager; and W. G. PROPER, Customer Service Manager. ■

OWENS-CORNING FIBERGLAS

One of the prominent corporations using RRC Magnetic Tape Storage, color-harmonized to their new RCA 501 installation

RRC offers the only complete Tape Storage System

1—Color-matched Cabinets in a variety of styles

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RECORDS RESERVE CORPORATION presents for the first time, the only complete Magnetic Tape Storage System. Reels are stored in non-breakable, transparent containers, designed to provide faster operation, easier identification, and more compact storage. The RRC cabinets engineered expressly for this container will save up to twenty percent in space requirements.

Write us, and let us tell you how your storage costs can be lowered and, at the same time, how the appearance and efficiency of your tape storage can be improved.

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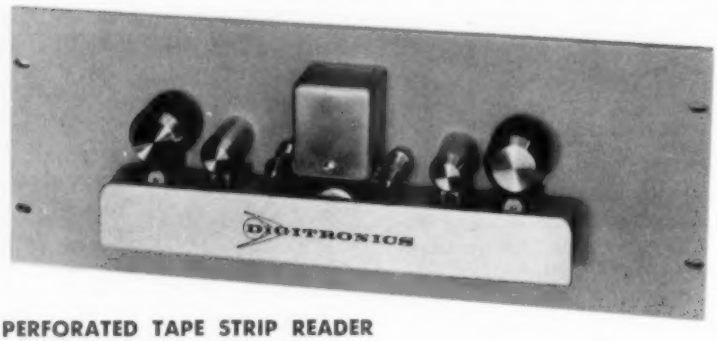


PERFORATED TAPE STRIP READER

A new Digitronics bi-directional high-speed perforated tape reader, DYKOR Model B3500, operates on loops or strips of tape. A bi-directional spooler is available at speeds up to 300 characters per second, with 8 inch reels. Part of the completely transistorized circuits are two flip-flops which provide reliable control of the four solenoids used to control start and stop in either direction. The B3500 enables high-speed search and then reverse to the beginning of the block which can then be read in its entirety.

The photoelectric reader senses tape perforations by means of silicon photodiodes which are set permanently in the head, with the diode lens protruding. The self-cleaning effect prevents accumulation of lint and the possibility of reading errors. The polishing of the paper or Mylar against the lens improves sensitivity.

The standard unit is complete with an 8 level plus sprocket reading head, power supply, gating and shaping circuits and amplifiers. For reading 5, 6, 7, or 8 level tape a variable tape guide is adjustable to three positions. The innermost position is used for 11/16″ (teletype) tape; pulling the guide out to a middle position sets it for ⅞″ (6 or 7 level) tape; the outermost position adjusts for 1″ or 8 channel tape.

Printed circuit modules are designed so that outputs consistent with PNP transistor circuits are standard and output for NPN circuits are available as an optional feature. The simple in-line feed means that load and unload are performed easily and quickly.

Circle No. 40 on Reader Service Card.

TWO DIFFERENT DOCUMENTS IN ONE OPERATION

Friden, Inc., San Leandro, Calif., announced a Systems Receiver Flexowriter which will permit such documents as orders and bills of lading, policies and policy records, to be typed automatically, simultaneously.

By simply cable-connecting the Systems Receiver to a master Flexowriter Programatic, which can automatically prepare documents itself and control auxiliary operations from a code-punched program tape, duplicate or different business forms may be run off at the same time on each machine.

This facility for completing two data processing functions from one control will bring these benefits: *one operator* to supervise automatic operations and to keyboard alphanumeric data on either machine when it stops for variable entries; complete *accuracy* because both documents are being typed at once from the same control with visible proof available immediately; *speed*, because a second, separate processing operation has been eliminated; and *flexibility* because any one of many Friden auxiliary readers input can be connected to the Programatic machine and information stored in the auxiliary tape can be manually or automatically selected for readout on either one or both machines, individually or together.

Circle No. 41 on Reader Service Card.

ELLIOTT 503 COMPUTER

In announcing its new digital computer, the Elliott 503, Elliott-Automation of London, England state that it incorporates the new ultra high speed switching techniques recently announced by the company. With a switching time of only 5 milli-micro seconds, the 503 is, by the best of present day standards, one of the fastest computers to be marketed anywhere. The high switching speed gives the new computer a working capacity incomparably greater than that of conventional types of machines.

Elliott engineers have designed the 503 so that it retains the simple, easily understood instruction developed for earlier types of Elliott computers. The company is producing a complete computer system for the 503 which incorporates an unlimited extension of the storage facilities by means of new high speed magnetic tape storage units as well as a wide range of input and output equipment and special keyboards for the running of parallel programmes. The capacity of the new computer is such that, by time-sharing, it will be possible for computers of this type to undertake a number of different jobs simultaneously.

A full range of automatic programming routines, including internationally agreed autocoding systems, will be available for the new computer. They are fully compatible with those now available for other types of Elliott computers.

Elliott-Automation considers that the first applications for a machine of this speed and work capacity are likely to be for scientific work in research establishments, universities and technical colleges.

Circle No. 42 on Reader Service Card.

OPEN REFERENCE FILES

Recently introduced by Diebold, Incorporated, a Canton, Ohio manufacturer of bank equipment and office equipment, is a new line of open reference and tub files featuring designed-in expandability.

Available in three standard widths —38", 60" and 68" these files embody a unique center support system that permits economical installation of multiple units and addition of supplementary files as the user's needs increase. Files are made in heights for standing or seated reference and are built to accommodate a comprehensive range of card sizes including tab horizontal or vertical, 5 x 3, 6 x 4, 8 x 5 and many other record sizes. In addition, the distinctive construction principles utilized in the files permit combined filing of different size records within the same file while keeping all records at the ideal working level.

Circle No. 43 on Reader Service Card.

LEDGER SHEET

A new ledger sheet for automatic accounting machines, featuring *"stripes"* of magnetic recording tape, has been announced by Bann Incorporated, St. Paul, Minn. Officials of the printing company cited the following advantages of tape ledger sheets over similar forms using other types of magnetic tracks: consistent signal output, reliability of performance, savings in time and operating costs, and less wear on the read head.

The sheets are designed for the Burroughs Sensitronic posting machine, which uses a magnetic recording and reading system for bookkeeping computation. This machine is widely used by banks for posting checks and deposits on ledger sheets which contain both the customer's statement and the bank's record of the account.

By means of magnetic tracks on the backside of the sheet, recording heads in the machines *"read"* the new information on the ledger, record the new entries, and automatically update balances—all within a matter of seconds. Bann feels its production methods of applying magnetic tape to the forms will allow for improved operating economy and a faster filling of orders.

Tracks on the Bann sheets are strips of *"Scotch"* brand No. 301, a high output oxide recording tape with a paper backing. The quarter-inch tape is produced by 3M specifically for this usage in 3700-foot lengths, bulk packed on metal hubs.

The Bann ledger sheets, for which patents are pending, will be marketed through bank stationers and accounting machine form printers throughout the entire 50 states and Canada.

Circle No. 44 on Reader Service Card.

"SNAP-A-WAY"

Wilson Jones Co., a leading maker of business forms, has redesigned its Grayline *"Snap-A-Way"* checks for magnetic ink encoding. The carbon-interleaved checks are now available.

The main change in design of the checks involves leaving space for a five-eighths inch clear band along the bottom of the check where magnetic characters can be imprinted by banks. Newly-developed equipment can sort the checks automatically at high speeds by reading the magnetic ink electronically.

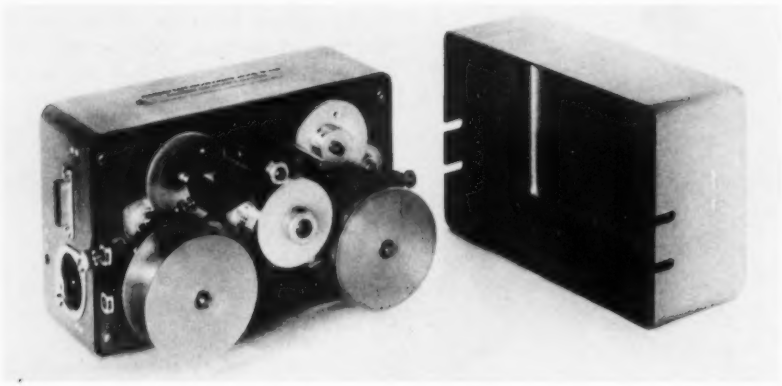
The American Bankers Association, in a study of automated check handling, recommended the uniform specifications on check design which have been adopted by Wilson Jones.

Five Federal Reserve System banks have made pilot installations of check processing equipment using magnetic ink recognition. The Federal Reserve Bank of Chicago said it is hoped that by the end of 1960 *"many banks will have made substantial progress in the use of checks encoded in magnetic ink."*

Grayline checks are available in quantities as small as 250. They may be *"crash imprinted"* to a customer's specifications, serially numbered, with the firm's name, bank and advertising logo or trademark.

The copies, used for reconcilement and check register purposes, contain punched holes for placement in permanent binders for filing.

Circle No. 45 on Reader Service Card.



PUNCHED TAPE PROGRAMMER

An 8-channel, time base punched tape programmer for automatic programming is now available from the Anaheim Electronics Division of the Electronic Engineering Company of California. The Model TP-860 uses standard teletype tape. It has a forward drive and automatic rewind with separate motors for each operation.

The programmer provides precision time base programming with 20 minutes of programming at a standard tape speed of 1 ips. It is a completely self-contained unit measuring 5 x 8 x 6 inches including space for storage reels to hold 100 feet of tape. Its output is an 8-channel switch closure with common return insulated from chassis ground. Price of the TP-860 is $875, f.o.b. Santa Ana, California, with six-week delivery.

Circle No. 46 on Reader Service Card.

PAPER TAPE TO MAGNETIC TAPE CONVERTER

A computer device to transfer data from punched paper tape to magnetic tape, the new IBM 7765 converter writes magnetic tape that can be read by a computer at 15,000 or 22,500 characters a second. Companies transmitting data with paper tape devices thus can achieve computer input at several times the speed of the fastest direct paper tape input.

The 7765 is expected to bring many paper tape users into the sphere of tele-processing—the transmission and processing of business and scientific data over physical distance.

Previously, for example, a large company mailing or telegraphing paper tape from field offices to computer headquarters for centralized payroll accounting might have converted the paper tape to punched cards, for relatively slow entry to the computer. For somewhat faster input, it would have to make a second conversion from cards to magnetic tape. Now in either case, the IBM 7765 is reported to save time overall, reduce punched card costs, and minimize the chance of human error in the conversion process.

Typical of the many organizations with extensive paper tape use for which the 7765 is designed are government agencies, utilities, railroads, aircraft firms, primary metal producers, and general manufacturing industries. Some of these companies have hundreds of devices generating paper tape in such high-volume applications as order processing, billing, inventory control, and engineering. (*One firm alone produces more than 5-million paper tape characters a day.*)

The 7765 will handle the tape widths and codes that make up the great bulk of paper tape volume. The machine is the first paper tape to magnetic tape converter that photoelectrically reads both chadless (*punched flap*) tape, and chad (*punched hole*) tape. Output is 200-character-per-inch Mylar magnetic tape.

The solid-state 7765 features thorough self-checking. It rents for $1,475 a month; purchase price is $69,500.

Circle No. 47 on Reader Service Card.

MACHINES THAT "READ"

The *"Shape Recognizer"* is an early experimental step toward machines that read. The machine displays a lighted square in the picture, showing that it has *"recognized"* a line drawing of a square. The device, which also identifies triangles, pentagons, hexagons and circles, was described by inventor Leon D. Harmon. The machine was built to demonstrate a principle that makes possible recognition of these drawings, whether they are large or small and no matter which way they are turned. Such principles are important to an understanding of ways to design versatile machines that identify a variety of characters. Machines of this sort would be of

(continued on next page)

value to the Bell System and many other businesses.

The light at the top illuminates the shape, which is *"seen"* by a scanner from below a clear plastic table. Photo-cells are mounted on the ends of 32 metal rods, pointing up. When an *"Identify"* button is pressed, the rods unfold simultaneously, like the ribs of an umbrella, so that each photo-cell is given a radial motion and crosses one boundary of the drawing. These crossings occur at different times for each photo-cell. The differences are used in a special *"logic"* circuit to determine the shape.

Circle No. 48 on Reader Service Card.

NEW COMPUTER MEMORY

An electronic memory, designed to keep pace with the prodigious capacities of today's computers, has been developed by Telex, Inc., St. Paul electronics firm.

Mass memories, on which big computers depend for the information they process, have been the chief obstacle to increased data processing speed and efficiency. Typical of existing mass memories are the magnetic tape systems—big brothers of tape recorders—which hold about three million characters of information on a reel 2,400 feet long. To search the entire reel for an item of information takes several minutes.

In contrast, the Telex Disc File resembles a complex jukebox. Its information is contained on from 16 to 64 discs, each 31 inches in diameter. The information is recorded on the discs and read from them in magnetic impulses by read-record heads which function somewhat like the recording and playing heads used for phonograph records.

Unlike record-player pickups, however, the Telex read-record heads never touch the surface of the recording discs. Designed like an airplane wing, the head flies on the rapidly-moving boundary air which surrounds the surface of the disc and remains about 3/10,000ths of an inch from the disc surface.

With two pair of heads and a positioning arm for each disc—one for the upper and one for the lower surface—information can be reported or extracted by directing the appropriate head positioning arm to the correct location on one of the 256 tracks contained on each recording surface.

As a result, the Telex II Disc File has a capacity of nearly 90 million characters, consisting of seven binary digits each, compared with a 5 to 10 million character capacity of existing disc file mass memory units. Access time has been reduced from seven-tenths of a second needed by present equipment to 150/thousandths of a second for the Telex Disc File. At the same time, cost is a fraction of that for memory devices of comparable performance.

The new Disc File, designed for use with all existing data processing systems, is housed in a cabinet about seven feet long, five feet high and 32 inches deep. A pre-production model is currently in operation and regular production is expected to begin in the near future.

Circle No. 49 on Reader Service Card.

"PIGGY BACK" FORM

A time-saving, *"piggy-back"* type of form has been introduced by Consolidated Business Systems, Inc., New Brunswick, N.J. Called the *"Redi-Check,"* it consists of a multi-part, carbon interleaved, continuous form carrying a 3¼" x 7⅜" detachable punched card check on the face of part one.

This form is flexible in its systems and procedures applications to accounts payable, inventory control, purchasing, invoicing, cost control, sales analysis, etc. For example, used as a remittance statement in accounts payable, the original of the form provides a recipient with identifying data and payment in one unit. The carbon copies are retained as the issuer's complete record of payment. Checks are prenumbered to agree with the statement consecutive number, prepunched for use with data processing equipment, and preprinted with location and arrangement of magnetic ink characters. The form is available in depths of 5-1/2", 7", 7-1/3", 8", 8-1/2", 10" and 11" and overall widths up to 25".

The check is in perfect alignment for punched card equipment; it is also practical for use on typewriters. Prepunching can consist of consecutive code numbers, bank transit numbers or any constant sorting code developed for automatic check reconciliation. Checks can be printed with standard or specially designed Pantographs and special E-13B font type magnetic ink characters for the common machine language on checks. The perforations are designed to permit a quick and easy separation from the remittance statement.

Circle No. 50 on Reader Service Card.

MISSILE TAPE RECORDER

A miniature missile-borne magnetic tape recorder designed to record through a 500-g impact deceleration and survive a 1500-g shock without loss of recorded data is being developed by the Wextrex Corporation, a division of Litton Industries.

The recorder is mounted in a hermetically sealed cylindrical case three inches high and four inches in diameter. Weight of the package, including tape, is less than four pounds.

The unit is designed to record more than 30 seconds of critical analog data during the flight of a surface-to-surface missile. ■

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Now available . . . the much desired "001" for punching numerical data into I B M cards. • Functional . . . . economical! A highly useful auxiliary punch. Use it to replace damaged cards . . . to make immediate corrections or additions without need to disturb normal key punch routine. Ideal for the programmer. • Sized for convenient personalized use . . . fits readily on your desk or at the computer console. • Light in weight, easily carried from one location to another. Neat too. Has self-contained chip box. • Simple in operation, requires no special instructions. • Numerical keyboard is standard IBM design, has tab stop with quick release. Allows alphabetic or multiple punching without back-spacing. • Punch is of highest quality . . . precision built of finest materials for years of trouble-free service, is unconditionally guaranteed against mechanical defects.

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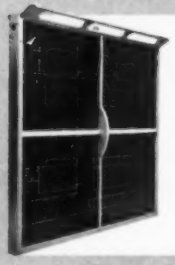

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PWI *Panels Wires Incorporated* 755 Pennsylvania Ave., San Francisco 7, Calif.

Circle No. 20 on Reader Service Card.

Business Forms of the Future

(continued from page 24)

number of cases where *"forms actually program machines." (Among recent developments in this area is the Royal Spacetronic, which, through the medium of special ink on the forms, automatically controls horizontal and vertical printing positions.)* This includes magnetic ink forms and forms which can be read by optical scanners. He points out that because these source forms are the actuating agents for the accounting system they must be precisely manufactured and printed. We would like to add that the foregoing predictions are Mr. Bower's own personal opinions and not necessarily those of all others in his company.

As this is beginning to sound like we're back to *"channel-twisting"* again, perhaps this would be an appropriate time to sign off. See you next month! ■

The Three Point Approach to Advancement

(continued from page 26)

stallation properly if the details of the job demand your constant attention. But, you may protest, there isn't a thing I'm doing that doesn't have to be done. Great. So you're not filling in crossword puzzles, or drawing funny pictures all day long. But what about that machine utilization report? Or the 407 panel you're about to wire? Or that special listing? Are these things so complex and vital that no one else in the department can be trained to do them?

If this is so maybe you need an assistant. Or, perhaps you're in a rut.

Whatever the case, here's Column 4, if the shoe fits. If it doesn't fit, enter a daily star, because it means you're a good boy. If you don't delegate and free yourself to work on Columns 2 and 3, it'll be old Stand-Still-Stanley for the rest of your life.

If you do follow this three point program on a daily basis the world is your oyster. All you have to do is pull that shelling knife out of the top drawer. ■

DATA . . . yours for the asking

For your convenience in obtaining pertinent and helpful information on the latest equipment, forms, services and related products in the data processing field, we direct your attention to the following free literature available from the manufacturers. Circle the numbers pertaining to the literature you wish to receive on the Reader Service Card appearing elsewhere in "DP."

FORMS COMPANY SERVICES offered by a company that specializes in the design and production of business forms is described in a new booklet available from UARCO Inc. The booklet explains how a forms company works to provide the best in forms and systems to assure maximum dollar value for the business forms used.

Circle No. 70 on Reader Service Card.

FACSIMILE COMMUNICATIONS EQUIPMENT is described in a new four-page brochure offered by the Westrex Corp., a division of Litton Industries. Illustrated is varied equipment designed for transmitting photos, messages, data, news and other types of graphic information by means of telephone or radio links.

Circle No. 71 on Reader Serivce Card.

TECHNICAL BULLETIN TRANSLATORS, published by Hermes Electronic Co., describes the various types and techniques of code conversion and the relative merits of different numerical codes which may be employed by the design engineer. A discussion on the theory of numerical codes is also included. Hermes Translators, which can be used to convert digital input data into usable output form, are described.

Circle No. 72 on Reader Service Card.

COMPUTER PROGRAM INDEX contains an extensive listing of applications prepared by G-15 computer users, and submitted to the Users' Exchange library at the Bendix Computer Division, through the G-15 Users' Exchange Organization. Programs developed by the Computer Division applications group are also listed. Programs in the following categories are represented: Traffic, surveying, earthwork, culverts and sewers, soils, interchange, bridges and piers, beams, columns, section properties, miscellaneous analysis, and hydraulics.

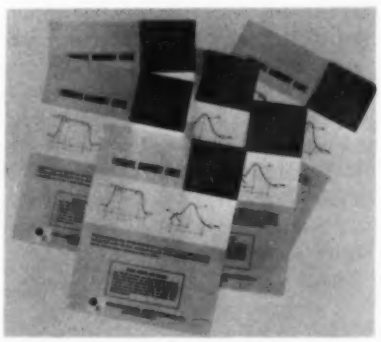
Circle No. 73 on Reader Service Card.

CONVERTING PRESENT BOOKKEEPING PRACTICES to low-cost, flexible punched tape accounting by producing both a printed and punched tape in one simple adding machine operation is explained in a pamphlet available from Victor Adding Machine Co.

Designed for the accountant who wishes to save write-up time and devote a greater share of his time to the higher level of his profession or the businessman with a desire for economical data processing, the system involves the Victor Data Punch adding machine for preparation of raw data and employment of a service center for processing.

Explanation of the procedure and samples of the resulting accounting reports are included in the brochure.

Circle No. 74 on Reader Service Card.



MAGNETIC CORE data folders issued by Telemeter Magnetics Inc. provide complete specifications for a series of storage cores providing a wide range of characteristics. These data sheets describe both physical and magnetic characteristics with information concerning applications.

Circle No. 75 on Reader Service Card.

(continued on next page)

"ELECTRONIC DIGITAL DATA HANDLING FOR COMMUNICATIONS" describes equipment now available as well as techniques and devices presently in test for accurate and speedy flow of information between the computer and remote stations.

Included is a description of two types of hardware designed to enable communications to bridge the data processing gap. The D300 series is equipment which immediately converts information between punched paper and magnetic tape in either direction. Modular construction enables the user to specify *"image"* conversion or, as optional features, format control, reordering and translation.

The D500 series provides for transmission as well as conversion of data. The same options are offered as well as the choice of one or more of several checking features.

Speeds, costs and equipment for all types of transmission media are compared, including teletype grade facilities, telephone grade facilities, audio and video. Savings for the computer user by use of *"off-line"* conversion equipment are detailed in a number of case histories. Line drawings compare the problems and terminology of the communication and computer people. Digitronics Corp.

Circle No. 76 on Reader Service Card.

DETROIT RESEARCH INSTITUTE has a new booklet available on instruction, research, courses, seminars and conferences for the 1960-61 year. This includes basic mathematical sequence and higher mathematics, management and physical sciences, including large scale problem-solving, both for science and business, relating to the use of electronic computers.

Circle No. 77 on Reader Service Card.

■ ■ ■

CLASSIFIED

FOR THE BEST PRICE contact us on Used Data Processing Equipment. We buy & sell IBM control panels & wires, IBM & Remington Tabulating Equipment, Card Housing Equipment (All types and makes). Consult us on your systems conversions. Universal Business Equipment Co., 533 S. Dearborn St., Chicago 5, Illinois, HArrison 7-4878.

BOOK SHELF

MANAGEMENT ORGANIZATION AND THE COMPUTER, edited by G. P. Shultz and T. L. Whisler, The Free Press, Glencoe, Illinois, 1960, 244 pages, $7.50.

Much has been written in the past decade to introduce management to the computer and its uses. Very little of this written material has been devoted to the effect of the computer on the organizational structure of the company, yet to every computer user this effect is of major significance. A notable exception to this lack of material is *Management Organization and the Computer.*

The book is a collection of papers presented at a University of Chicago seminar sponsored by the McKinsey Foundation. The editors have divided the papers into four parts: (1) a discussion of ideas about the impact of computers on management; (2) an analysis of the technological developments in data processing; (3) a presentation of new concepts of organization; and (4) five case studies. Each of the parts is well done and presents concepts of value to any manager, even if he has no plans to use a computer in his organization.

Of particular interest to those already familiar with business-computer applications is the section on technology dealing with such questions as: What *is* a computer? What can it do? How much decision-making can be given to it? In what way does the computer relate to the world of the administrator? What about the economics of computers? Not all the answers are given, of course, but a fresh approach is presented which helps one find his own answers.

The case studies are presented by managers and represent management's views of five computer installations. The value of these studies lies in their similarity; there is a broad outline of organization which all have been forced to follow. The problems and frustrations of one are common to all.

Management Organization and the Computer should be on the *"must"* list of every executive having anything at all to do with data processing.

INFORMATION PROCESSING, Proceedings of the International Conference on Information Processing, UNESCO, Paris, 1960, 497 pages, $25.00.

In June, 1959, UNESCO held an international scientific congress on computation and its state of development. The papers of the congress are presented in *Information Processing.* These papers, generally, are technical and extremely detailed. They are printed in the language in which they were presented, English, French, German, and Russian.

The seven chapters of the book, each having up to twenty articles, are: (1) Mathematical methods of digital computing; (2) Common symbolic languages for computers; (3) Automatic translation of languages; (4) Pattern recognition and machine learning; (5) Logical design of computers; (6) Computer techniques of the future, and (7) Miscellaneous topics. They cover, to a large extent, the developments in scientific computation made thus far.

The book has much information, and should be accessible to everyone in scientific computation.

John DeJong

■ ■ ■

4

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. . . SAVE UP TO 95% SET-UP TIME
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. . . REFOLD AUTOMATICALLY
. . . MINIMIZE DOWNTIME WITH UNBROKEN JUMBO PACKS

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Coming Events

Oct. 10-13

Systems & Procedures Association International Systems Meeting
Hotels Commodore and Biltmore
New York, N. Y.
Includes Electronic and Systems Seminars
Contact: ISM, c/o Otis Elevator Co., 44 Wells Ave., Yonkers, N. Y.

Oct. 20-22

Institute of Management Sciences, 7th International Meeting, Session on Computers in Simulation.
Hotel Roosevelt, New York, N. Y.
Contact: James Townsend, 30 E. 42nd St.
New York 17, N. Y.

Oct. 22-26

Controllers Institute of America
29th Annual National Conference
Hotel Fairmount
San Francisco, Calif.

Oct. 26-27

Computer Application Symposium sponsored by the Armour Research Foundation of the Illinois Institute of Technology
Morrison Hotel, Chicago, Ill.
Contact: Andrew Ungar, ARF, 10 W. 35th St., Chicago 16, Ill.

Oct. 31- Nov 2

13th Annual Conference on Electrical Techniques in Medicine and Biology, sponsored by ISA, AIEE, IRE.
Sheraton Park Hotel, Washington, D. C.
Contact: Dr. R. L. Bowman, National Heart Institute, Bethesda 14, Md.

Nov. 1-4

Business Equipment Exposition sponsored by Office Equipment Manufacturers Institute
Memorial Sports Arena, Los Angeles, Calif.
Contact: OEME office: 777 14th St., N. W.
Washington 5, D. C.

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COMPUTER OCCUPATIONS

THE OCCUPATIONAL RESEARCH UNIT of the Michigan Employment Security Commission has put out a booklet, *Computer Occupations*, explaining possibilities in computer work for young people. The booklet tells of the nature of the work, working conditions, where such jobs are located, possible earnings, the future of employment in this field, requirements for this work, and the disadvantages and advantages of computer work.

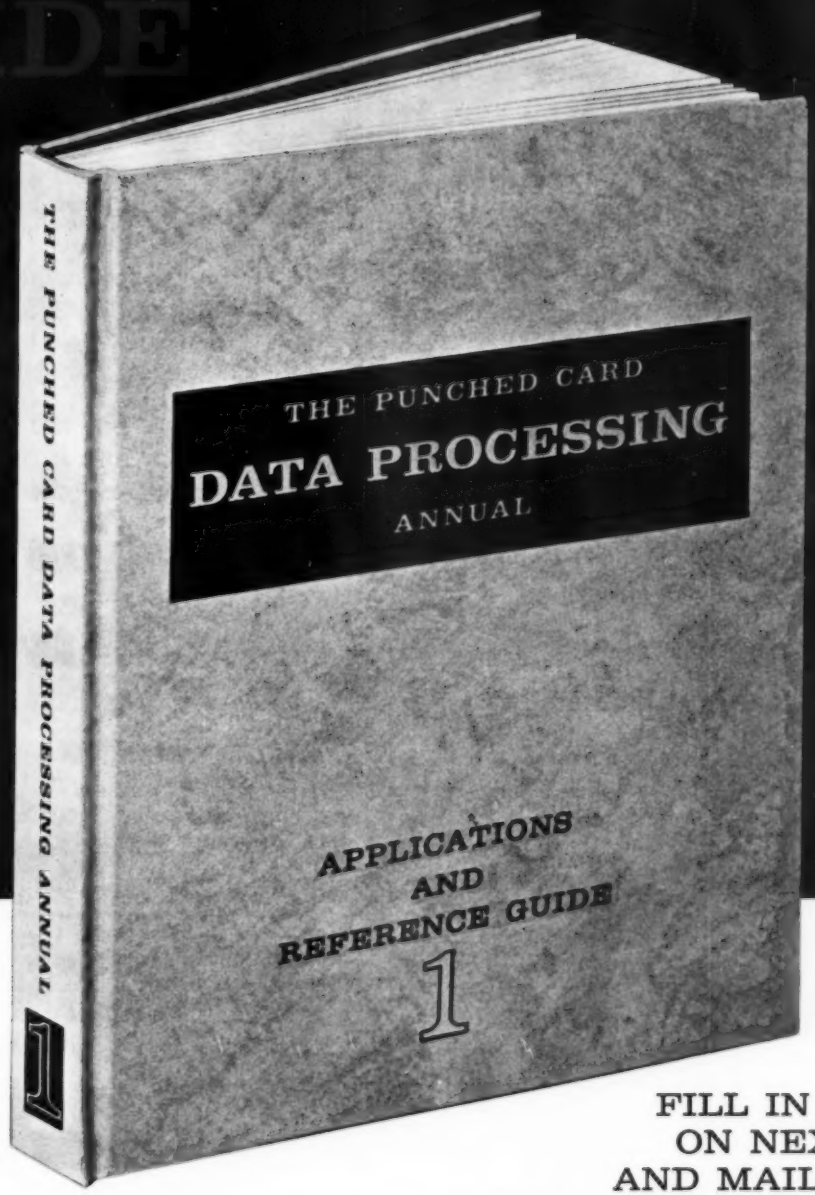
There are references for further reading for those who wish to pursue the matter further.

The Michigan Occupational Guide Series booklets are furnished free to schools, colleges, public libraries, and agencies doing vocational guidance work in the state.

The booklets are available to anyone else for a nominal fee of 25 cents per copy, from Michigan Employment Security Commission, 7310 Woodward Ave., Detroit 2, Mich. The Commission asks that remittance accompany each request.

NEW...

PUNCHED CARD - DATA PROCESSING REFERENCE GUIDE



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INDUSTRIAL DIVISION

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editorial

ARE YOU an "analyst", or a "synthesist?" An analyst takes apart or separates the whole into its constituent parts. In the field of data processing, an analyst breaks down and examines present procedures in order to get a clear view of the problem. Incidentally, if done properly, all analysts working with the same information should find the same problem.

On the other hand, the synthesist combines separate elements into the whole. He is the man who starts with definite problems and develops a system that will provide the answers.

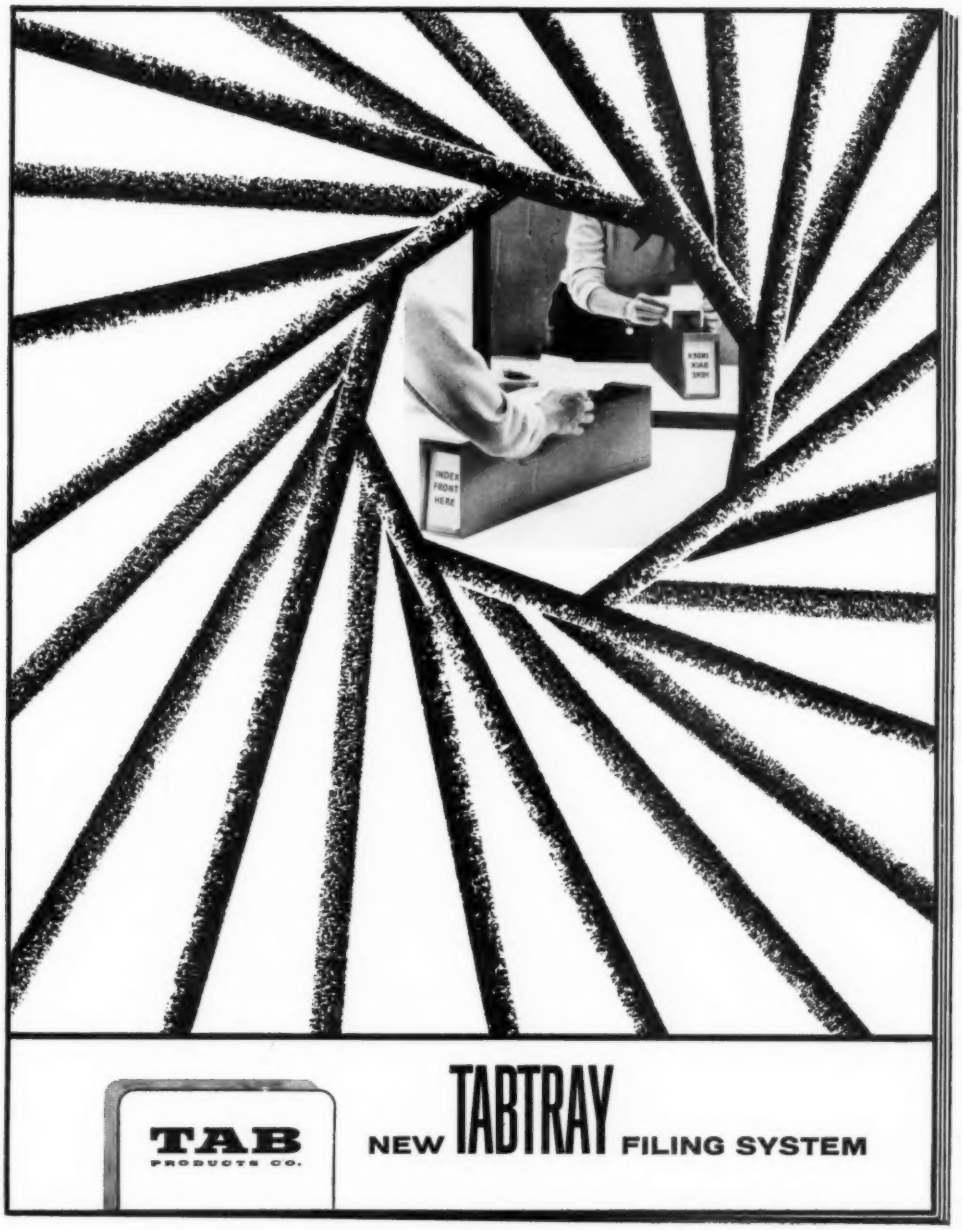
Analysis and synthesis are so closely related that most systems men have both responsibilities. We might assume that a good analyst is also a good synthesist, but here is where we should take a closer look. Most of us do an acceptable job of analysis – substantiated by the fact that solutions are found to provide the desired answers. However, no one system is the best solution to a given problem. Therefore, the synthesist is seldom questioned about his system as long as the answers are right.

Because there are many possible systems that will work, and because few systems are critically reviewed, we can expect that a large number of systems in use are inferior.

The key to more effective (economical) systems lies in broader machine knowledge and higher quality thought. Each system or procedure must be designed as a whole, and with overall economic considerations. This is true for all data processing equipment.

When looking at the complete picture we often find that the old rules of thumb mislead us into poor practices. For example, it might actually be less costly to run extra (non-print) cards through an expensive printer rather than sort separate them out prior to printing. Yet, we intuitively spare the use of more expensive equipment with the assumption it would increase our cost.

Better systems can be achieved by desire and by willingness to think out each solution objectively. Better systems may be your most effective tool in reducing data processing costs. ■



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**Prestidigitatorial* means sleight of hand—and could well describe the almost magic efficiency and speed of vertical card handling with our new Tabtrays.

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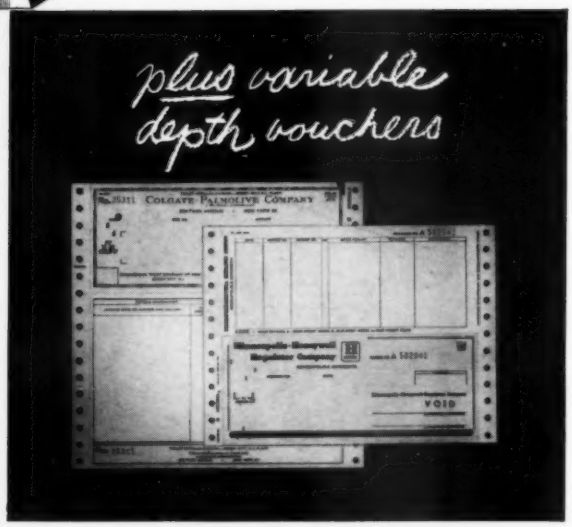

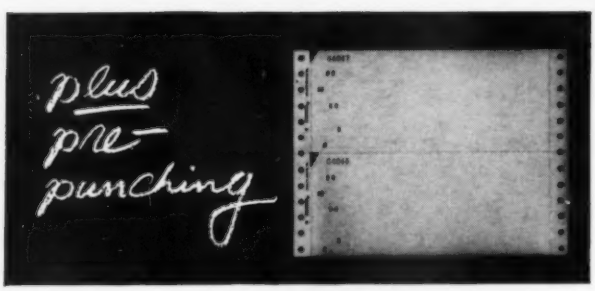

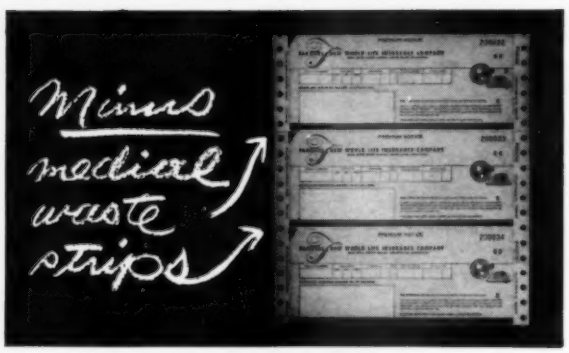

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